The Builder.

VOL. XXVI.—No. 1337.

Gossip in the South Kensington Museum.

RELICS from Abyssinia, no great things, have doubled for many weeks the usual number of visitors to the Kensington Museum; the ordinary average of 10,000 giving place to one of about 23,000. Very puzzling are these spontaneous regularities, as we have said before. Thus in the week ending July 25th, there were 22,000 visitors; in the week after, 21,000; and then in following weeks, 26,000, 25,700, and 21,000. The number is now lessening somewhat, and then will come for weeks and weeks again a steady 10,000, little more or less. There is always something new in the Museum, and if this lead to such constant change in the arrangements that it is sometimes difficult to find what is wanted, it has the advantage of assuring visitors that they can scarcely go too often. It is to be hoped that some of our student readers sketched the carved pine-wood doorway, of the eleventh or beginning of twelfth century, from the destroyed wooden church of Sanland, in Norway, and which was in the north court for some time. It is a remarkably fine thing of its sort: the vigour of the large dragons in the spandrels, and the beauty of the curves in the foliage, are very noticeable. The wood is remarkably sound. This, together with another not in such perfect condition, and which came from the church of Flaa, demolished in 1854, were lent by the Norwegian Government, and have been recently removed from the Museum. Plaster casts, however, are in their place, so coloured, that they closely resemble the originals. On another page we print a letter from a correspondent, who, looking at these doors and their surrounding framework, asks whether it can be necessary to paint deal used externally in order to preserve it, no paint or varnish, apparently, having been applied to these doors. The difference in climate would have to be considered in giving an answer, as well as the difficulty of obtaining in this country such pine-wood as the Norway doors were made of. Our own experience with unpainted deal doors in England, exposed to the weather, is not satisfactory.

It may be as well to add, touching the Norway work, that some similar carved early doorways from Norwegian churches,—Hitterdall, Tind, and Borcund,—are illustrated in Weale's "Quarterly Papers."* The older timber churches of Norway are very curious piles, wrought piecemeal and constructed without any skill in forming a whole; carved work being introduced by individuals here and there to lessen the original rudeness and want of design.

Carved work of another kind will be found in the very curious pulpit, or "mimbar," from a mosque in Cairo, which has been set up in the same court that holds the doorways, and which is becoming a court of fine pulpits. The mosque, built between 1412 and 1421, was pulled down not very long ago, and the Department were enabled to buy the pulpit, the date of which, according to an Arabic inscription on it, must be between the years 1468 and 1496. Its general form is excessively ugly, but the carved and inlaid work, ebony and ivory, with traces of colour, is very elegant. The surfaces are covered with star-shaped panels, formed by a moulding of triangular section; and within these panels are the carvings, which include inscriptions from the Koran. The stiles, with their coarse sunk ornament, seem scarcely to agree with the panel-work.

Near the pulpit there is a table-top of fifteenth-century work, also from Cairo, which shows the same stellar forms and inlayings.

Look to the modern wrought-iron Prussian gates close by, purchased at the Paris Exhibition for 400*l.*,—a very small sum considering the remarkable extent to which they are wrought. These materially lessen the effect of the Norwich gates now standing close to them, and of which we gave an illustration some time ago. What would a similar pair cost in England? Perhaps the Skidmore Company will tell us. The Museum, by the way, contains some capital specimens of English iron-work, especially the gates formerly in the gardens of Hampton Court Palace. These were made by Huntingdon Shaw, a native of Nottingham, about the year 1695. These gates should be carefully studied by all our smiths: it was quite right to bring them under cover.

The vicissitudes through which some of the objects now in the Museum have passed are remarkable. A cognate story occurs to us. Some little time ago, at a sale in an ancient house in inland England, the auctioneer said, "How much for the plaster cast in the hall?" and a whitewashed head in a niche over a door was knocked down for 7*s.* 6*d.* When taken down it proved, however, to be of metal, and it was at once sold for 3*l.* or 4*l.*, and then went to a shop in Brighton for about double that sum, where it remained for many months, until it was purchased for something under 20*l.* by a well-known art-loving resident there, who bought it rather to serve the shop-keeper than to please himself. It remained in his house, and was very little cared for, until the Exhibition of Works of Art in Lewes, to which he had sent it, was opened, when a London dealer sought to buy it, but did not go the right way about it, and so failed. Up to this time it had been called at a guess Sir Thomas More; but being sent to a London friend and talked over at the Society of Antiquaries, some good eye said it was very like Henry VII., and on being taken to the chapel at Westminster it was found to be nearly identical with the bust of the recumbent effigy of the monarch. Tradition says something of a trial piece made by Torrigiano before executing the monument, and here it is thought we have it. Torrigiano seems to have been brought to England expressly to work for King Henry VIII., and according to Vasari did an infinite number of works for him now unknown. The king made an agreement with him to execute a monument for himself and Queen Katherine, and Torrigiano tried to persuade Cellini to come to England and help him in it, but through circumstances unknown it was never carried out. After the bronze bust of which we have been speaking had been identified it was lent to the Department of Art, and the Committee of Privy Council thinking it desirable that the nation should possess it, the seven-and-sixpenny "plaster cast" was bought for the Museum for some hundred and fifty guineas, and may be found there (and a fine thing it is) not far from a cast of the Westminster effigy, so that those who are curious may compare for themselves.

The New Lecture Theatre is fast approaching completion: it will hold from 500 to 550 persons in the body of it, besides 200 in the galleries on special occasions. It is somewhat lofty: how this may interfere with its acoustical qualities will have to be seen. The tympanum externally, above the entrance, is filled with a large inlaid picture commemorating the Great Exhibition of 1851: a draped figure, probably her Majesty the Queen, is presenting wreaths to representatives of the various nations who approach on each side, a view of the building forming the back-ground. The figures are in outline, the colours being buff and blue, with a gold sky. In circular frames under the arcade, and so protected, three of the workers in mosaic now practising in England have been each enabled to put up a specimen of their art and workmanship, and with good effect.

In the new refreshment-rooms some interesting experiments in decoration are being made. Mr. E. J. Poynter, who has designed a quaint range, being entrusted with one of the dining-rooms, and Messrs. Webb, Morris, & Co., with another. We cannot say that we greatly admire the ceiling of the latter; but, as the room is at present unfinished, like the rest, it will be better to withhold judgment. The painted glass in the window here is very agreeable: the figures show the hand of Mr. E. Burne Jones, who is also, we believe, to fill some of the panels in the high wood dado round the walls. It is assuring to hear that Mr. Morris, of this firm, is the author of "Jason," and "Earthly Paradise," poems that have been well received by critics. The design for the large window on the chief staircase was obtained in competition, the jury including several members of the Royal Academy. It is by Mr. Reuben Townroe, a pupil of the late Mr. Godfrey Sykes, and has been well produced in glass by Messrs. Lavers & Barraud. The design urges "Work while it is day," and is intended to illustrate part of the 38th chapter of "Ecclesiasticus," beginning, "How can he get wisdom that holdeth the plough." A series of small pictures represent suggestively the labour of the smith, the potter, and so forth. The style may be called Cinque-cento. The semicircular head is full of a debased sort of architectural ornament, and is over-fussy. The window at the foot of the stairs, illustrating "Fictile," "Architectura," and "Fabrense," was designed by Mr. Moody, and for parts deserves praise. To an eye fresh from the study of the windows in Fairford Church, it is, nevertheless, but thin and poor.

Travelling to that same Fairford, by the way, the other day, we were greatly struck with the exceptional fruitfulness of the berry-bearing trees and shrubs. For at least four miles the hedges are as red as a soldier's coat. The "hips" and "haws" of the wild rose and hawthorn are in the majority, but others contribute, and are added to by unripe blackberries and occasional masses of elder-berries not yet black. The effect is quite remarkable. Shakspeare, the omniscient, describes it. Changing only one word in two lines from *Macbeth*, these berries,—

> "The multitudinous *trees* incarnadine,
> Making the green, one red."

We have been led away, however, from South Kensington, so will here end our present gossip.

* Vol. i., under the heading of "Primitive Churches of Norway."

COURTS OF CONCILIATION AND ARBITRATION.

IN Plantaganet and York and Lancastrian times most of our leading trades were under the management of a knot or certain number of the "good folks" of each of them. These "good folks" made for their respective trades the regulations that governed them; and, in the city of London, at all events, were supported in their decisions in the settlements of disputes by the chief magistrate. In France, as early as 1285, there was a court of *Prud'hommes*, or prudent men, who were appointed to sit in the Civic Hall, Paris, for the purpose of advising in cases between the citizens; and, in the fifteenth century, there was a similar court established at Marseilles, for the adjustment of all disputes between fishermen and their employers, and another at Lyons for the settlement of the disputes of merchants frequenting the fairs. But where there was one man on the ground in those days there is now a little crowd, and regulations that were seldom broken through then are quite obsolete, either scorned or forgotten, now. The French were the first to exhibit a desire to return to the old system that was found to work so well in former times and elaborated it to suit present requirements. In 1791 a court composed of masters and workmen was established at Lyons, for the settlement of differences occurring in the various trades. But it did not maintain its authority during the eventful years that followed; for, on the visit of the Emperor Napoleon, in 1806, to Lyons, the municipal leaders represented to him the great desirability of renewing its powers then in abeyance. Not only did Napoleon re-establish this court, but he resolved to found similar institutions in all the principal manufacturing towns. Up to 1844, however, Paris was not included in the list of towns and cities so benefited, on account of the apprehensions that were entertained that the numerous varieties of industries carried on there would occasion too many complicities; but Louis Philippe was not appalled by the prospect of any difficulties, and created four councils of Prud'hommes for the department of the Seine. In 1849 there were twenty-four of these councils in France. There are now eighty. The first approach to the formation of a court in England having similar powers, was made on the present decade, when the hosiers of Nottingham established a court of conciliation and arbitration, an example that has been since followed by the joiners of Wolverhampton, and still more recently by the potters in Staffordshire.

We have before us a work written for the especial purpose of promoting the formation of courts of conciliation by placing within everybody's reach exact particulars of the steps necessary to be taken for this purpose.* The author, who is a Scottish barrister, says, "The example afforded by the success of the Nottingham Court of Conciliation and Arbitration is one which will no doubt be followed by other communities; and should the Government not at once lead, instead of being led by the people, the result will be—certainly one of a very humiliating, if not dangerous character—that the people will learn to do that for themselves which their legislators have either been unable or unwilling to do for them." He contends that the present authorities for adjudicating upon disputes between employers and employed—justices of the peace — are quite unqualified for their task, and prophesies, indeed, their abolition. In their place he would institute boards or courts of conciliation and arbitration framed on the model of the councils of the Prud'hommes. Accordingly, he shows us these last-mentioned courts, describes their powers and machinery; describes the French justice of the peace, or *juges de paix*; paints their English and Scottish counterparts, and gives some of their questionable judgments; describes the civil legislation affecting masters, workmen, servants, and apprentices prior to 1824, and that which has been enacted since that period; and finally depicts the practical working of courts of conciliation and arbitration, descants upon their advantages, and describes the best modes of establishing and conducting them. All this is done in an impartial and earnest, though at the same time arousing, manner. He points to the facts of foreign locomotives running upon British railways; wagon-loads of doors and windows arriving ready made from Norway and Sweden; the accession of business to the forges of Creusot; the activity of the hammers of Essen; the shuttles of Verviers, and the frames of Chemnitz; and calls upon employers and employed alike to cease the absurd system of strikes and lock-outs, which is gradually reducing the national powers of development, and organize a tribunal at which their differences may be discussed and the causes of them removed, without the extreme measures that are introducing foreign industry into the country. He says:—

"Never, perhaps, in the annals of trade has there occurred such a number of strikes in almost every branch of it, as have taken place within the last two years; and seldom have they continued in individual cases for such lengthened periods. At no time were they so likely as they are now to cause the forfeiture of that remarkable pre-eminence in the world's industry, so nobly won for us by the skill and energy of our forefathers. Thousands of workmen and their families must have suffered privations of which we can never know the extent; while many employers have doubtless sustained losses which it may take years of exertion to repair. The inveterate character of these disputes would seem in a great measure to have arisen from the want of some adequate machinery in our judicial system, by which the questions involved could be fairly determined. Employers and employed have been hitherto in the position of litigants without a forum to decide their differences."

This desired forum is to be found in the proposed extension of courts of conciliation and arbitration, the outlines of which were indicated in the bill introduced into the House of Peers by Lord St. Leonards, in February, 1867, entitled "An Act to establish Equitable Councils of Conciliation to adjust Differences between Masters and Workmen." Few of our readers need be informed that the distinguishing characteristics of these courts is the absence of professional legal men. In the French courts, upon which they are modelled, "no practitioners of the law are allowed to appear upon any pretext whatever." There are three paramount objects kept in view, —the provision of judges skilled in the matters in dispute, the inspiration of confidence in the justice of their decisions, and the conciliation of litigants; and these are deemed best managed by the selection of an equal number of representatives of capital and labour as members, and persons of standing and character in the community as judges. To make the province of the French courts clear, we cannot do better than quote the words of M. André, president of the Council of Troyes:—

"In every case the council endeavour to discover the truth,—to find out from what side the wrong comes. Sometimes by observations addressed to the masters the latter are induced to modify their demands. By remonstrances, friendly but firm, they cause the workmen to see the unreasonableness of unfounded pretensions. Both are reminded of their reciprocal duties,—the masters that they ought to forego everything tending to humiliate, to overlook a first offence, to be mild in command and moderate in reproof, and to respect the position of men whose lives are consecrated to toil. To the workmen they recommend deference to the employer, who by his wealth and enterprise furnishes them with the means of earning a comfortable subsistence; regularity and care in performing their work; and a faithful and zealous use of their master's time. It is by approaching cases in this spirit that the *prud'hommes* succeed in getting the parties to see their complaints in their proper light, to retire from the court conciliated, and disposed to resume relations which have thus been only temporarily disturbed."

Does not this calm, kind statement show us the crowded French court? We cannot turn over the page without feeling we have seen Alphonse, or Jules, or Emile, in blouse and belt, mustachioed and sunburnt, active, dexterous, and good-looking withal, explaining his case to a bench of men, bearded also and grave, older than himself, who are taking the kindliest interest in it, and as he and, perhaps, his *chef d'atelier* embrace through their good offices and mediation, we fancy there is a little flutter in the air as though angels were rejoicing over this scene of goodwill among men. Contrast this with the dismantled room of the operative who has struck or who is locked out, his wife too ill-clad and ill-fed to have a smile or pleasant word left, his children too reduced to be anything but an agony of misery to him, and we must own that the offices of the "good folks" of yore and the "prudent men" of to-day are not without their value. The classes of disputes of most frequent occurrence in France are thus divided by M. Mollot, one of the numerous authorities consulted by Mr. Macdonald to give weight and testimony to his work:—

A master brings a complaint against one of his workmen—

For having inflicted upon him some injury by contravening a law or regulation;

For having refused to fulfil a contract either actually entered into or implied by the custom of trade as to work, time, or price;

For having purloined or injured materials given him to work upon, or committed other offences of a like nature.

On the other hand, the workman complains—

That his master has injured him by contravening some particular law or regulation;

Or that he has dismissed him at an inopportune time, contrary either to actual agreement or established usage;

Or that he keeps back the whole or part of his wages;

Or that he refuses to give him a *congé d'acquit*, or certificate of his having fulfilled his engagements; or to return him his *livret*, a book containing his name, age, birthplace, trade, and other particulars, which he is obliged to hand to an employer on his engagement. And though some of these are not the sort of disputes that arise among ourselves, we have few indigenous grievances that might not be settled at similar tribunals.

Mr. Macdonald gives some droll stories to light up his subject. He would show the inadequacy of Scottish justices of the peace to cope with industrial legislation, and says that the jurisdiction exercised by them should be transferred to trained and independent judges, even though the change would deprive the country squire, after the gout had destroyed his aptitude for fox-hunting, from sitting in judgment upon his natural enemy, the poacher, and should also prevent Bailie Makumsmart from repeating the address maliciously ascribed to him when sentencing "an ill-faured loon frae the Briggate" to thirty days, "because the offence hadna been fully proven;" but adding, with a look of ineffable wisdom and severity combined, "had it been sae, I wad hae gi'en ye saxty!" Again, he gives slight biographical sketches of the professional men mentioned by Boswell in his account of the action of the negro knight to maintain the freedom he believed he was entitled to by touching British land; and in that of the matter-of-fact Lord Hermand he relates that a pleader of protracted eloquence was one day stating a case before him, when his patience was quite worn out; at last the laborious pleader saw his lordship in the act of bundling up his papers, and evidently not listening to what he was saying, "But, ma lord," said Mr. Baird, in consternation, "I'm no *exousted* yet,"—meaning, of course, that he had not exhausted the case; to which Hermand, in a deep growl, replied, "But I *am*," and so closed the debate. And there are more anecdotes of legal celebrities. The most practical part of his volume, however, is that which relates to the formation of the courts he advocates. This information is as valuable as the process is simple. It was Lord Brougham's suggestion that an English barrister should visit Paris for the purpose of examining the working of the French Courts of Prud'hommes and then lecture upon them throughout this country, so as to prepare the public mind for them, that first drew the attention of our author to the subject. The machinery to set the formation of such a court in motion is merely this:—A meeting must be called, when a minute must be drawn up to the effect that it is convened for the purpose of forming a Board or Council of Conciliation and Arbitration between masters and workmen, and appointing a committee to prepare the necessary rules and regulations. The committee and secretary duly appointed, their names are recorded in the minute. A second meeting must be called by the secretary to consider the rules and regulations drawn up by the committee; and these being discussed and approved, and the expenses of the court provided for, nothing remains but the drawing up and despatch of a petition to the Queen to grant a licence for the court to exercise its powers. Our author gives the proper form of the minutes and petition; and also shows the rules for regulating the carpenters' and joiners' branch of the Wolverhampton building trade, and those of the board of arbitration and conciliation of the hosiery and glove trade, Nottingham, which contain material enough to serve as models for any other. It seems to us his labours will materially assist the movement that is tending to supersede the present cumbrous mode of managing industrial relations.

* "Handybook of the Law relative to Masters, Workmen, Servants, and Apprentices, in all Trades and Occupations. With Notes of decided Cases in England, Scotland, and Ireland; together with Forms of Proceedings and Procedure, to enable Masters and Workmen to establish Courts of Conciliation and Arbitration, and to carry on the Same." By Alexander Macdonald, Solicitor, Glasgow; Member of the Faculty of Procurators, Greenock. William Mackenzie: London, Edinburgh, Glasgow, and Dublin. 1868.

Mr. Macdonald extracts from the reports of the artisans selected by the Council of the Society of Arts to visit Paris and report upon their various trades such passages as relate to the Courts of the Prud'hommes. Although these reports have been before the public in various forms, they are useful to look at again in illustration of the question before us. They sing a uniform note of praise of the French plan. The sentiments of Mr. L. S. Booth, a working representative of the Coventry trade, may be selected as a sample of the rest:—

"There subsists a very friendly feeling between the manufacturers and workpeople; this has been attributed to the action of a society called Conseils des Prud'hommes, a Society of Prudent Men, formed of various trades of workpeople and masters, to adjust the differences that from time to time arise. A gentleman, occupying a responsible position in St. Etienne, assured us it was the best institution in France, and had the confidence of all parties. It does not interfere with the price of labour or the working of contracts. It is a council of conciliation legally established, and all its decisions of not more than 200 francs are binding upon both parties; and though it often deals in matters involving a greater sum than this, appeals against those decisions are very scarce."

Mr. A. Kay, joiner, states, in plain terms, not only the well-working of the courts, but the mode in which a case is conducted. He says, the workman who considers himself aggrieved has merely to go to the court, report his wrongs, and pay a fee of 3d. A summons is then issued for the complainant and defendant to appear before the council within a day or two. If the council should fail to reconcile them, which is seldom the case, for nine cases out of ten are settled at this stage, the plaintiff pays into court two francs, and another summons is issued for a fresh appearance in the judgment-hall. This is generally appointed for an early day, as no time is lost in unnecessary delay:—

"When the parties appear in the judgment-hall, they find ten members of the Conceil des Prud'hommes seated on a raised platform, the president sitting in the centre, when they courteously and with great familiarity hear the statements each have to make. In some cases the matter is so clear and evident that the judges give their verdict without rising, and give the injured party a slip of paper to take to the officer who is appointed to carry the sentence into execution. But the case may require some consideration: the ten judges then rise and retire to the adjoining room, and then they compare the facts of the case, and decide on judgment. That judgment may not be final; the one who deems himself the injured party may appeal to the Chamber of Commerce; but before his case is entertained there he must deposit 400 francs to pay the expenses, and the case is not often worth that amount."

Mr. Macdonald says, however, it is not necessary to deposit the 400 francs mentioned above. He states that, when the demand does not exceed 200 francs, the judgments of the court are final; and where it is above 200 francs the court can order immediate execution of the same to the extent of 200 francs,—"that is to say, the party obtaining a decree to be put immediately in force for a sum exceeding 200 francs, must find caution or security for the surplus in case of appeal to the Tribunal of Commerce." In fine, he has gathered together much that has been said about these courts, and adds exact particulars that he has spared no pains to verify.

As incidental to his subject, our author has compiled a long list of decisions in England, Scotland, and Ireland, illustrative of statutory and common law. Most of them relate to workmen and servants of various kinds and their employers. They are useful as showing how the law has been read in these instances, and, consequently, how it may be expected to be read in others of a similar nature. A large number of them relate to persons engaged in building trades. We would refer our readers to them as concise statements of liabilities and responsibilities of general industrial interest. Here and there amidst his pages we find little scraps of history that are suggestive. Thus we learn that justices of the peace were first created in France by Edward I. of England, though, as now constituted, they only date from 1790; that the Scottish colliers were really bound to the coal they worked, and were sold with it when a coal-seam changed hands, down to the year 1775; that the whipping of females was not abolished till the reign of George IV.; and other curious facts. Take it all in all, Mr. Macdonald's work is, in many respects a fit lay sermon to the text he has chosen as a heading for it:—"Moreover, there are workmen with thee in abundance, hewers and workers of stone and timber, and all manner of cunning men for every manner of work. Of the gold, the silver, and the brass and the iron, there is no number. Arise, therefore, and be doing, and the Lord be with thee."

THE "BUILDER'S" PLEA FOR CABBY.

A PARTIAL insurrection, which our French or our Prussian neighbours would have harshly and summarily dealt with, has been suffered to bleed itself to death in the streets of London. It has bled, happily, from no wounds but those inflicted on the pocket. Those belligerents are happy who stanch such wounds before they become fatal. The cab proprietors of London, having, or pretending to have, a grievance against the railway companies, caused their drivers to strike against the public. In order to compel the railway managers to admit to their station-yards, on equal terms, those vehicles the owners of which were willing to give certain guarantees, and those not so recommended to the public, the cab-owning interest had the wit to persuade their servants to refuse, in defiance of the law, to serve the general public. The ill-designed strategy had the result inseparable from ignorance of the laws of war. The aggressors had to beat a retreat, and this was happily effected before any great amount of ill-feeling had been developed on either side.

With the public, then, the victory remains, and, as far as the specific cause of complaint, and the means chosen to enforce it, rightly so. But it not unfrequently happens, in social disturbance, that the immediate occasion of an outbreak is not its real cause. That may long have been smouldering beneath the surface, ready to burst forth on the slightest opportunity. Let us ask ourselves whether such may not have been the case in the present instance. The railway companies may be altogether justified in their treatment of public vehicles. Are the general mass of the inhabitants of London equally in the right?

The point to which we refer, and which belongs specially to our columns, is that of the shelter afforded to public vehicles in London. Shelter, indeed, there is none. A wealthy and luxurious people, proud of their humanity, supporting by voluntary subscriptions a society to prevent cruelty to animals, a people specially addicted to the breeding, the riding, and the driving of the horse, is content to leave all the animals which carry on the public internal communication of the metropolis without any recognised provision for shelter or for feeding-place.

That cab-horses have stables somewhere, and that their drivers may sometimes (perhaps on Sundays) retire to some other bed than that which is extemporised from the interior of their vehicle, we take, indeed, for granted. That much we leave to private enterprise. Perhaps we are right in so doing. To take us through the streets, whether with the easy speed of a Hansom, or at the more deliberate grind of a four-wheeler, it is essential that the horse should have been fed, and groomed, and rested somewhere or other, within a day or two; and, though we allow feeding, and that waiting which is a substitute for rest, to be carried on in the very midst of our most crowded thoroughfares, we have not yet come to see much grooming on the stands. Evidently, therefore, there must be cab-stables somewhere, but *where* is known to none but their occupiers. In all weather, and in all seasons, by day and by night,—in summer with a temperature of 90° in the shade, in winter with the ground covered with snow and the thermometer below zero,—the horses and the drivers, on whom and on which we all depend when time is an object, are left unsheltered and uncared for. Their normal shelter is the sky.

Is this as it should be? Is it fair to a large body of hard-working, industrious, careful men? We expect very much of the London cab-driver, and not only so, but we obtain very much from him—very much more than we did ten years ago. Civility is now the rule; formerly it was the exception. Knowledge of the town, care and speed in driving, cleanliness of vehicle, and we may say of person, we demand without stint. It may often happen to a person not over familiar with town to ask direction from a policeman, and to discover, after a bout of that amusing fence in which the natives of the Emerald Isle so much delight, that he is seeking guidance of an Irish recruit, who knows less of London than himself. But how rarely do we find the cabman at fault; and when he is, how patiently he follows up the scent! What is his pace, and what his care at crossings and corners, when you can only catch the express train by making for the station at some ten miles an hour? In all frequented streets of the metropolis, for at least twenty hours out of the twenty-four, we expect, by lifting up the finger and vociferating "Hi!" to be accommodated with a carriage driven by a man who can tell us where we want to go when we do not exactly know ourselves.

Now, it is a great hardship that no public shelter is provided for these hardworking public servants. What we say of the men will apply with even more force to the horses, for the horses are unable to pop inside for an occasional nap. Their food is given by the painful and unsatisfactory appliance of the nose-bag. Their protection, after an hour or two of rapid driving, is a rank that enables them at leisure to fill their bellies with the east wind. No valuable horse can be exposed to the unsheltered vicissitude of a cab without almost the certainty of disease. In all this lies a great and unnecessary waste,—a cost to the owner which the public, in one form or another, must ultimately defray. To demand the constant attendance of thousands of horses, and to make no provision whatever for their protection from the weather, is a disgrace to our civilisation.

Who should provide the shelter? it may be asked. Our reply is, that we are indicating a want, but not promoting a speculation. Some co-operation should be brought to bear on the matter. Public shelter, protected sheds, in which the tired horses could feed and rest till their time came to leave the rank, ought to be provided at public expense. If this were done, it would no doubt admirably pay to attach stables and mews to the public sheds. If an association of the cab owners were formed, or any arrangement were made by which a horse that had set down his last fare at Paddington should not have to be driven to Islington or to Southwark to pass the night, the economy of labour would be its own reward. The lodging of the drivers themselves is another matter for consideration, and the men would, of course, wish to regain their own homes. But when we remember the hours which they keep, the distances which they are forced to drive empty-handed, and the constant exposure incident to their vocation, as well as that to which they are unnecessarily exposed, we cannot suppose that the drivers, as a body, would not rejoice at any step in the direction of organising their protection from needless toil.

Let us heap a few coals, then, on cabby's head. Let us tell him, and not in print only, but in brick and mortar, that we are better friends to him than he has been to himself. "You have been out of temper, my good fellow," let us say; "small blame to you for being a little vexed at times. You have a good deal to put up with. You have been hardly used. But you have made an ass of yourself, notwithstanding. It is not the railway managers of whom you should complain, but the Lord Mayor, Aldermen, and Burgesses of London; the vestrymen of Marylebone, of Southwark, of St. James's; the municipal authorities, in fact, who neglect you. Call another indignation meeting, and direct your resolutions against the fact of utter want of shelter for so large a body of the servants of the public. Ask for shelter for man and beast—for yourselves and for your cattle. Tell your great employer, the public, that it was but natural you should have made that earnest, though ill-considered, effort to take shelter under a roof of any kind. Even draughty stations are preferable to the open street. Put your shoulder to this wheel, and call on the humane, the benevolent, the prudent, for aid. Enforce the view that the reform of street vehicles depends on some better shelter being provided for them than the centre of the street. Stick to this, worthy friend, and when one, or five, or twenty years hence you rest quietly for your turn in a clean, light, airy, sheltered stand, thank us for the hint, and remember "the *Builder's* plea for the cabman."

VIEWS AS TO THE GREAT PYRAMID AND OTHER ANCIENT STRUCTURES.

SIR J. Y. SIMPSON has published in pamphlet form a corrected abstract of his remarks on Professor Smyth's idea of the Great Pyramid, from No. 75 of the Proceedings of the Royal Society of Edinburgh.* Some additional points, such as with reference to the concentric circles and other carvings on rocks and kists, are dwelt upon in an appendix. The communication may be called a review of a review, inasmuch as it was provoked by previous criticisms of Professor Smyth, who still maintains the metrological hypothesis.

* Is the Great Pyramid of Gizeh a Metrological Monument? By Sir J. Y. Simpson, bart. Edinburgh: A. & C. Black. 1868.

Sir James here demolishes this hypothesis with a heavy hand; and to that end he has made able use of Professor Smyth's own implements, as well as others. The Professor, it will be recollected, made a special journey to Egypt for the purpose of verifying his own idea; and it must be said for him that he appears to have given a very faithful account of the result, inasmuch as it was mostly dead against himself. This Sir James Simpson clearly and forcibly shows. The kist in "the King's Oratory," as it has been called, instead of being cut out with all that mathematical accuracy with which it was said to be cut, and which was to have been anticipated had it really been the result of inspired handiwork, and destined to form a strict measure of capacity to the latest ages, was found by Professor Smyth, as he himself reports, to be of even carelessly irregular form. On this subject Sir James, after having pointed out other facts adverse to Professor Smyth's hypothesis, says:—

"But in regard to the coffer as an exquisite and marvellous standard of capacity to be revealed in these latter times, worse facts than these are divulged by the tables, &c., of measurements which Professor Smyth has recently published of this stone vessel or chest. His published measurements show that it is not at all a vessel, as was averred a few years ago, of pure mathematical form; for externally it is in length an inch greater on one side than another; in breadth, half an inch broader at one point than at some other point; its bottom at one part is nearly a whole inch thicker than it is at some parts; and in thickness its sides vary in some points about a quarter of an inch near the top. 'But,' Professor Smyth adds, 'if calipered lower down, it is extremely probable that a *notably* different thickness would have been found there . . .' Further, externally 'all the sides' (says Professor Smyth), 'were slightly hollow, excepting the east side;' and the 'two external ends' also show some 'concavity' in form. 'The outside' (he avows) 'of the vessel was found to be by no means so perfectly accurate as many would have expected, for the length was greater on one side than the other, and *different* also according to the height at which the measure was made.' 'The workmanship' (he elsewhere describes) 'of the *inside* is in advance of the outside, but yet *not* perfect.' For internally there is a convergence at the bottom towards the centre; both in length and in breadth the interior differs about half an inch at one point from another point; the 'extreme points also of the corners of the bottom not being perfectly worked out to the intersection of the general planes of the entire sides;' and thus its cavity seems really of a form utterly unmeasurable in a correct way by mere linear measurement—the only measure yet attempted."

One would have thought that the Professor himself had thus demolished the metrological hypothesis even in his own estimation, but it seems not; and although he admits that "the coffer's precise size is the question of questions," its precise size is still undecided; for Professor Smyth has only measured what remains of the defaced kist, and his measurement is only one of twenty-six varying measurements. Nevertheless—

"This broken and damaged stone vessel is professed to be the *permanent* and perfect miraculous standard of capacity-measure for the world for 'present and still future times;' and (according to Mr. Taylor) that it might serve this purpose, is formed of one block of the hardest kind of material, such as porphyry or granite, *in order* that it might *not* fall into decay; for 'in this porphyry coffer we have (writes Professor Smyth in 1864) the very closing end and aim of the whole pyramid.'"

Sir James Simpson's own idea is that the kist was merely a sarcophagus; but, although we have already expressed our own opinion also that it was a sarcophagus, there are peculiarities about the case which induce us to believe that, like the coffin in Freemasonic rites,* it was originally "used for the living, and not for the dead," as has actually been said of "the King's Oratory" itself, in which it stands, and which was carefully and scientifically ventilated, and closely resembles a temple or chapel in sectional outline and general arrangement, with its vestibule and its stately and hall-like penetralia, divided by its screening but lifted partition, or "portcullis," of stone. The fact now adduced by Sir James Simpson, on the authority of an ancient author, Ibn Abd al Hakam, a contemporary, or nearly so, of the Caliph al Mamoon, who tunnelled into the pyramid and discovered the King's Chamber, that the body of a man was found in the sarcophagus, does not settle the question any more than the discovery of the body of a man beneath a church altar would decide the question whether the edifice in which it was found was merely a sepulchral monument.

Herodotus tells us, as to the Pyramid of Belus at Babylon, that it had a shrine below and a chapel above, in which chapel there was a bed on which a priestess lay by night [entranced in "the semblance of death" as she must have been, like "the mad prophetic Sibyl" of Æneas, who, "in her cave, upon a rock, by night, reclined"], while God-possessed, or visited by the God Belus; and a golden table, on which, we may conceive, the Sibyline oracles of the God were probably written down. The shrine below, in the Babylonian pyramid, would respond to the sepulchre, indicated but not completed, in the rock below the Egyptian pyramid, while the Pharaoh's chamber or oratory above would respond to the chapel. Now, had the body of a man been recorded by some old author to have been found in the bed of the chapel of the pyramid at Babylon,—and it was not unusual in the East to have beds in sepulchres,—that might have been supposed to settle the question of its merely sepulchral nature; but this would have been quite an erroneous settlement, since Herodotus happens to have recorded the fact of a very different purpose. Yet there is nothing improbable in the supposition that a dead body might have been found there after Herodotus's time. The practice of interring the dead in edifices devoted to religious rites has been a very common one, as we all know. Moreover, as regards the religious rites of the Egyptians, they were magical, just as those of the Babylonians and other heathen nations were. So were the Mithraic rites; and the Mithraic *caverns, or cells* of the Cabiri, in which these very rites were practised, although they were sometimes subterraneous, also, according to Faber, sometimes lay *concealed* in the *centre of enormous buildings of the pyramidal form, or even in a temple at the top* of the pyramid. The temple or chapel of Belus at Babylon stood exactly in such a position as the temple of Buddha now does in modern Chaityas in Ava and Siam. So is it with many American pyramids, their temple having been called by the aborigines, "the house of the God." New Grange, in Ireland, of which Sir James Simpson speaks, is entered, like the Egyptian pyramid, by a long narrow passage, or transe, as it might be called in Scotland,—leading to a central chamber or cell, deep in the heart of the pyramid; and the analogy between the Egyptian and the Irish pyramid, which was long since pointed out in the *Builder*, Sir James appears to consider a very strong one. Now, it is evidently of precisely such a pyramid or tumulus as that of New Grange that the Taliesin or Druidical records, quoted by Davies, to whom Sir James also refers as an authority, have thus spoken:—

"In the dales where the courses surround the circle [and the Caer] He (the god Hu—pronounced Hee) *arouses* who is partly covered and partly bright" [like the soul-translating Mercury of the "entrancing rod," one of whose sides was dark and the other light]. "He is now," says Davies, "in the mystic cell. 'Let the renowned, the enterprising (hero, Eidiol [Image of the God], or Ambrosius whose actions are recorded in the Golodin) be lulled in sleep [or "death" while the God "arouses" or awakes and "lives alternately."] . . . let *Hu* mildly warm him with *his divine presence*. The man who *rushes forth* [as the God does suddenly in the Oracle] . . . *is the bedfellow* of him who *rests in the narrow house, under the tumulus* [as Belus was the *bedfellow* of the priestess who *rested* on the *bed* in the chapel of the tumulus or pyramid at Babylon] . . . . The victor directs his view over Manon, the luminary with the lofty front and the red dragon, the Budd (or Victory) of the Pharaon' (or higher powers)."

In this fragmentary record of Druidical rites there is, as we see, a curious conglomeration of remarkable words suggesting those close connexions which actually did exist between Druidism, Buddhism, and Egyptian magic. "The Budd of the Pharaon" is a very notable phrase in this respect, and the connexion between the Budd and the dragon suggests the curious *penchant* of the Chinese and other Buddhists for dragon forms. Even the Manon, or luminary with the lofty front, smacks not a little of the Memnon statue and its peculiar relationship to the rising sun.*

It is also notable, with reference to what we have said of the New Grange Pyramid, that, according to an eminent Runic scholar, Mr. Rafn, a similar tumulus, barrow, or pyramid, at Maeshowe, in Orkney, is called, in a Runic inscription within the chamber, or cavern, in the heart of the pyramid, a "sorcery hall," which name very curiously responds to what is said of the cell, or cavern, in the heart of enormous pyramids, where the Mithraic rites of magic or sorcery were practised.

We may here suggest, in the form of questions,—Were not the *Druids* closely related, at least in magical practice, or religion, to the northern *Drows* or Trows, the fairy-like *dwarfs* of the Scalds, who seem to have been sorcerers or spirit raisers, "most powerful at midnight," like the Druidical "night hags" or "children of the evening," and to have inhabited dales, caverns, and the interior of green "knowes" or hilly mounds, so that they were called "the subterranean people?" And were not these of the same race as the *little men* of prehistoric archæology? The existence of sorceretic and caverned or celled tumuli or pyramids,—artificial caverns in fact,—not only in Ireland, but in Orkney and Baffin's Bay, points attention in this connexion, as we have before observed, to such northern peoples as the dwarfish Picts and Drows of ancient times, as well as to the Esquimaux, and especially to that curious people the Laps, who are not only a "little people," or *dwarfs*, but still abound with magicians or sorcerers; and are said to be, as a people, so singularly susceptible to nervous impressions, that the sudden clapping of the hands will sometimes cause them to fall into trances. It would be interesting and important to know more of the Laps and Esquimaux, their habits and customs, than we yet do. As the present inhabitants of Norway are specially related to those of Orkney, so may the ancient inhabitants of Lapland have well been to the Drows and Picts of Scotland, especially at a time when frozen seas united the higher lands of the two partly-submerged countries in the winters of the glacial and early post-glacial eras. No doubt *there are traces in ancient legend and tradition* allusive to the peoples of the drift, the lake, the dale, the cavern, and the tumulus, just, such as we have of the Druids in connexion with *celled or chambered tumuli* and with *dales*, as well as *lakes*, like the Irish fairies, or "little people;" and of the Picts, or at least the Drows, in connexion with *dales, caverns, mounds*, and *subterranean dwellings*. Now is the time to collect every scrap of such legendary and traditional traces, and to bring them to bear upon the great pre-historical questions at issue in geological archæology.* Then, perhaps, we may find that the Great Pyramid, ancient as it is, forms but a link between the historical period and the pre-historical, and is of less antiquity than many of the chambered tumuli either of Western or of Eastern climes.

It is no doubt the most popular and sceptical, and hence the *safest* policy, *at present*, to ignore all magical practices and doctrines while attempting to unravel the mysteries of ancient chambered tumuli, or pyramids, cromlechs, &c., and ancient sculptures; but there is no better ascertained fact than that ancient and pre-Christian nations, in all parts of the world, were deeply,—intensely, and probably universally, embued with such magical practices and doctrines; and no archæologist who is ignorant of these, or who attempts to unravel the mystery of ancient structures and sculptures without taking them into consideration, is at all likely to be able to advance the true theory of the uses or purposes and meanings of such structures and sculptures.

Before concluding, we may refer to what Sir James Simpson says, in the appendix to his pamphlet, as to the concentric circles and other sculptures on rocks and in cells such as that of New Grange. He appears to be very much inclined to resolve many of these into mere unmeaning ornament, and perhaps he is, to a certain extent, right. Yet he admits that the concentric circles with central cup inscribed on the inside surface of the lid of a stone kist or two, to which, in a general way, he himself alludes, were, like some others, "possibly of a religious character." Still he speaks of "the probable *ornamental* ORIGIN of our cup and ring carvings" in a very general way. There is nothing more probable, however, than that the cup and ring, or centre and circle form, was of symbolical *origin*, however frequently it may have been *finally* used, like the T in Etrurian pottery, as mere ornament. This was sufficiently shown in the letters On Rock and

* See Letters on Geometrical Symbols, by J. E. Dove, in *Builder*, vols. xxi. and xxii.

* Another of the Taliesin fragments given by Davies is as follows:—"In the sacred course, on a serene morning, when Hu sent forth his *dancing* beams, making this demand:—*I require men to be born again* [into the new life of initiation—the life of entrancement, or God-possession] in consideration of those liberal ones [those liberated or free ones?] who will be [who have been?] lost—those *blessed* [those *ecstatic* or entranced] ones—they have been *intoxicated* and *lost*." Here and in the other fragment we find that the *cell* or chamber within the pyramid or tumulus where the God (and hero) "lived *and died* alternately," had relation to a "new birth," *in "the light,"* as the coffin has in the Freemasonic mysteries, which are believed to have been identical in meaning and purpose with ancient religious mysteries, both Gentile and Christian, those under consideration inclusive.

* The truthfulness involved, to some extent at least, in Eastern tradition or legend, with its enormous elephants and tortoises, long disbelieved in as utterly devoid of truth; and in Western as well as Eastern legend, with its dragons and its other monsters, equally disbelieved in, has been singularly corroborated and illustrated by the discoveries of geologists; and so may the truthfulness of the traditions and legends to which we have just been referring, be illustrated and confirmed by the discoveries of pre-historic archæologists.

other Symbols by J. E. Dove, in our columns, a few years since. There it will be seen not only what the circle and centre symbol denoted among various nations, this being an *almost universal* symbol; but that the concentric circle and centre forms were, in particular, an ancient Jewish symbol, named the Sephiroth, the precise meaning of each portion of which is recorded and known.

The prominence which Sir James gives to the *comparatively rare* occurrence of the concentric circled symbol on kists, as evidence that such symbols were "connected with the burial of the dead" gives an erroneous idea of the small evidence,—if any,—of their sepulchral character which really exists; for it is known and has been specially remarked by those versant with the localities in which such symbols are mostly found, that very few have any connexion with ancient places of the dead, while hundreds appear to have had distinct associations with the ancient haunts of the living. Nevertheless, even though they were proved to be sepulchral, that would not disprove their magical or religious character—quite the reverse.

BEDFORD CASTLE.

ON the left bank of the Ouse, about 50 yards from the stream, within, but upon the eastern edge of the town, is to be found all that remains of the once-celebrated and very strong Castle of Bedford. These remains, though scanty and confined to earthworks, are very marked and of a durable character, and, although the fame of the castle rests upon its adventures as a Norman fortress, there is reason to suppose that it had an earlier history, and that its present relics belong to that earlier and Saxon period.

The principal work is a motte or mound of earth, wholly artificial, placed upon the gravelly plain across which the Ouse winds its way down the broad band of the middle oolite. This mound is circular, now about 15 ft. high and 150 ft. in diameter at its summit, which is perfectly level, and has for above half a century been employed as a bowling-green. The slopes are uniform and moderately steep, and planted with trees and shrubs. On the north side, or that farthest from the river, an excavation has been made for an ice-house; but this is of modern date, and does not appear to have laid open any traces of masonry below the surface of the ground.

Towards the river, and westwards towards the town bridge about a furlong above the castle, the ground is perfectly flat, and under cultivation as a garden; but, on the north and north-east it is rather higher, and here are traces of a ditch at the foot of and concentric with the mound, and no doubt a part of its defence upon this its weaker side.

The only masonry that can possibly be old is a small rectangular mass on the south side of the mound, and which now carries a modern summer-house. The ragstone of the country, of which this fragment is comprised, weathers so rapidly, that it is difficult to form an opinion upon its age; but, though possibly old, it is probably of very recent date.

Looking to the position of the mound as regards the river, and to the low and flat character of the ground about it, it is evident that the great strength of the place must have been derived from the Ouse, here deep and broad, and from banks of earth and ditches filled from and communicating with the river. The entire absence of masonry and the disappearance of all but a trace of the surrounding banks and ditches, commemorated in the Chronicles as once so high and deep, are fully accounted for by the circumstances recorded of the famous siege by Henry III.

Bedicanford, or Bedford, was well known to the Saxons, and a town probably of Saxon origin. Here, just outside the town, was buried in 796 the Saxon Offa, king of Mercia, in a chapel long since swept away by the flood waters of the Ouse. Early in the tenth century the town was attacked by a party of Danish settlers from the five burghs, who were beaten off by the townspeople, and shortly afterwards Edward the elder repaired the place, and erected what some call the suburb of Mikesgate, and some a strong place, on the southern side of the river, possibly a cover for the "ford," which contributed towards the name of the town. Bedford was without doubt an important town under the Saxons, and as at Tamworth, Leicester, Wareham, and Wallingford, had a citadel at one angle of the enclosure, upon the river.

The Barony, also called the Honour, of Bedford, was conferred by William Rufus upon Payn, second son but eventual heir of Hugh de Bellocampo, or Beauchamp, a companion of the Conqueror, and possibly allied to the greater family of that name, who afterwards held the earldom of Warwick. Hugh was the recipient of many manors in Buckingham, and about twenty in Bedfordshire. Payn is the reputed builder of the Norman castle, described as of great strength, with ditches and ramparts of earth, and which descended to his son Simon, steward to King Stephen. The family, however, afterwards took part against the king, who seems to have attempted to settle the fief upon the daughter of the eldest brother, married to Hugh, surnamed "Pauper," brother to the Earl of Leicester. Stephen laid siege to the castle in 1137, and after five weeks of leaguer, obtained it by a compromise.

Simon de Beauchamp held the castle through the reigns of Henry II. and Richard I., until his death, about the 8th of John. It appears from the red book of the Exchequer that he held 36 and 5-10ths knight fees of the old feoffment, and 8 fees of the new, all in the barony of Bedford. In his time the castle seems to have been held against Henry II. since in the second year of that king, 1155-6, those burgesses of Bedford who were in the castle against the king were fined twenty marks, of which sum they rendered account in 1157-8. In 1190 Simon fined 100*l.* for the governorship of the castle.

William, son and successor of Simon, is described as lord of the strong castle of Bedford, the caput of the honour or barony. He took part with the rebel barons towards the close of John's reign, and in 1215 admitted their forces into his castle. In consequence it was attacked by the well-known Falk de Breauté, and, not being relieved, was surrendered in November, after a seven days' siege. John was himself present at Bedford thrice in that year, in all for eight days. He granted the confiscated barony to Falk.

Falk strengthened and held the castle into the reign of Henry III., and hence ravaged the country below the Chilterns. At first a supporter of the young king, he afterwards resisted his authority, and, at the instance of his oppressed neighbours, Henry de Braibroc was sent to Dunstable in 8th Henry III., 1224, to try their complaints, when thirty verdicts were found against the baron, and fines of 100l. upon each of them imposed. In revenge, Falk kidnapped the judge and lodged him a prisoner in Bedford Castle, treating him with much indignity. His wife complained to the Parliament then at Northampton, and the king ordered him to give up the judge, but in vain. Henry was probably glad of the opportunity of crushing a very turbulent subject, and appears to have lost no time in punishing the affront. In June, 1224, commences a series of orders, issued by the king himself, and which show the greatness of his preparations for a siege, and the vigour with which he pushed them forward. On the 22nd of June, Henry was at Bedford in person, and there remained during the siege until the 19th of August, nearly two months. The preparations were both extensive and minute, and the mandates, always described as pressing, were issued to a vast number of sheriffs and other persons as far south and west as Corfe Castle and St. Briavels. They include men, money, arrears of scutage, cord, cable, iron, steel, hides, leather for slings, twine for strings, mangonals, petraries, balistæ, quarrells, stone shot, quarrymen, masons, miners, carpenters, saddlers, wagons for conveying the royal pavilions, and almonds, spice, and ginger for the royal still-room. All the smiths in Northampton who can forge quarrell bolts, or feather them when forged, are to work day and night until 4,000 are ready and despatched. Large quantities of wine from the royal stores in London, at Northampton, and elsewhere, are to be forwarded with speed to Bedford. Knights performing castle guard at Lancaster are ordered up: greyhounds are sent for for sport. The sheriff of Bedfordshire is to supply quarrymen and masons with their levers, hammers, mauls, and wedges, and everything necessary for the preparation of stone shot for the mangonels and petraries. Miners come from St. Briavels, in the Forest of Dean. Windsor supplies its master carpenter and his mates. Cambridge sends cord and cable. Charcoal comes with the iron and steel from Gloucester, and the adjacent Abbey of Newenham spares a large quantity of raw stone to be converted into shot.

The details of the material supplied are recorded in the close rolls of the period. The particulars of the siege itself have been preserved by the neighbouring monks of Dunstable, from whose town, and probably from whose monastery, the judge had been taken, and whose fellow-townsmen played an important part in the siege. The king brought with him the Archbishop of Canterbury and divers bishops and abbots, by whose interest was granted to him two men from every hyde of their church lands, to work the siege engines; an aid of "carllage" or a mark from each caruca or plough land of demesne, and 2s. from each held in tenancy, gifts which were guarded against being drawn into a precedent by special charter from the king.

Falk left his brother to abide the attack, and sought aid on the lands of the Earl of Chester, Ranulph Blundeville. The earl, however, was with the king, together with Peter de Rupibus Bishop of Winchester, William de Cantelupe, Brian de l'Isle, and Peter de Maulay. All were suspected of disaffection, and in consequence the earl and the bishop left the camp, although the earl was afterwards brought by the Bishop of Chester to his duty. Falk remained at Northampton until he fled to Wales.

The siege operations included on the east front a petrary and two mangonels, which daily battered the opposite tower; on the west front, two mangonels bore upon the old tower; on the north and south fronts were two mangonels, one on each, and each breached its opposing wall. The operations of these seven pieces of ordnance were materially aided by two large wooden turrets, tall enough to command the whole castle, and supported by other smaller turrets, all charged with archers and crossbow-men. There was also the timber covered-way known as a cat, by the aid of which miners were able to undermine the wall, while the bowmen cleared the battlements above. These works were thickly covered with hides, rendering them proof against fire; and the slingers, of whom there were many, probably kept up a general and incessant shower of pebbles upon all who dared to show themselves on the ramparts.

The works were stormed by four vigorous assaults. First the barbican was taken, with a loss of four or five of the assailants. Then entrance was effected into the outer ward. This was the work of the men of Dunstable, and was attended with severe loss. In this ward were stored most of the munitions of the place,—arms, horses and harness, cattle, bacon, and live hogs. Much forage was here burnt, with the houses and sheds in the ward.

The miners next underworked the wall next the old tower, which wall fell. The resistance here appears to have been obstinate, many lives were lost upon the breach, and ten of the most forward assailants were taken and carried into the interior of the place.

Finally, on the vigil of the Assumption, 14th August, about the hour of vespers, the miners having undermined the foundations of the old tower, fired the props. The walls split, the smoke rose, and, the place being no longer tenable, the garrison hoisted the royal banner and surrendered, sending out de Braibroc with the wife of Falk, and the other women. Next morning the king took possession. William de Breauté and the garrison were put upon their trial, and he and about eighty of his men were hanged out of hand. Three were allowed to join the Templars in Palestine, and the castle chaplain was delivered over to the archbishop as the spiritual power. It appears from the records that the remainder of the garrison escaped with fines and confiscations. The spoil was considerable, in treasure, provisions, and munitions of war. Henry left for Kemeston (Kempston) on the 18th, but was again at Bedford on the 19th, and at Dunstable on the 26th of August. Even when flushed by success he seems not to have been severe upon those not actually implicated. Alice, widow of the executed William de Breauté, was allowed her dower-lands in Bedford and Cumberland. On the 19th and on the 22nd Margaret, wife of Falk, was allowed for her subsistence the manor of Heyford and Sabridgeworth. Gilbert de Breauté also was allowed a manor; and Falk, the author of all the mischief, had twenty marks allowed for his personal expenses on his way to exile.

Immediately upon the surrender Henry broke up the siege establishment. 900 quarrells, the residue of the 4,000, were returned to North-

ampton, and the Sheriff of Beds is debited with the remaining iron, charcoal, &c., collected for the siege operations. The mangonels and heavy artillery were to be taken to pieces and returned to Northampton Castle. Various payments were also made and rewards given, chiefly out of the confiscated De Breauté lands. John de Standon, the king's miner from the Forest of Dean, had land granted him under St. Briavels.

The castle itself was far too strong and too dangerous to be spared, and the orders for its destruction are very sweeping and specific. By an order of the 20th of August, five days after the surrender, the sheriff is ordered to level the banks, fill up the ditches, and make plane the surface of the outer ward. He is to reduce the mote or mound and the walls of the inner ward by one-half their height, and to level three-fourths of the old tower towards St. Paul, that is on the north-west. The stones are to be divided between William de Beauchamp for his proposed house, the Church of St. Paul, Bedford, and the Priories of Caldwell and Newenham; but the last is to have the larger share, because it supplied stones for shot for the siege.

Five days later came out another order enforcing the former, and directing Henry de Braibroc and William de Pateshull to see to its prompt and accurate execution. It was also specified that William de Beauchamp might, if he pleased, build a dwelling-house on the site, and use the reduced wall of the inner ward, but he was not to raise the mound or the wall above a certain height, or to embattle it. He might only erect it. Braibroc is to see the stone from both walls and mound distributed as directed. September 16th, the sheriffs of Herts, Cambridge, and Hunts were ordered to send men to aid Braibroc and Pateshull in the work of destruction, and they are to take tools with them, and stay until the mound is lowered and the ditches filled up as ordered. Beauchamp was further allowed half the timber from the barn and the old tower.

Thus passed away the strength and glory of the Castle of Bedford, the great fortress of the Ouse. Whether William de Beauchamp built upon its site does not appear. He died 44 Hen. III., and within a very few years his name was extinct and his barony divided.

The castle, or its site, probably as the seat of a manor court, is named from time to time in the *Inquisitiones post Mortem*. Thus, 5 Ed. II., Roger L'Estrange, by Margaret his wife, was seized of "the Castle" and the "site of the Castle" of Bedford; 1 Ed. III., John de Mowbray was seized of the site of Bedford Castle and the fishery of the Ouse; and 40 Ed. III., another John had suit of court in the Castle of Bedford; and 50 Ed. III., Elizabeth, wife of John Mowbray, holds of the same castle. Also, 6 Rich. II., another John Mowbray is seized of Bedford Castle and Bedford Barony; and, finally, 8 Hen. IV., Thomas Mowbray, Earl Marshall, holds Bedford Castle in chief, by the service of almoner to the king at his coronation; so that the tenures and privileges attached to the castle remained in force long after the fortress itself had been razed. In Leland's time, the castle mill—that great evidence of feudal customs—remained; and he also mentions the "great round hill," as a burrow for foxes. There were not then any buildings.

It is evident from present appearance that the mandate of Henry III. was strictly obeyed. No trace of a ditch is to be seen between the mound and the river, and the mound itself is so much lower than is usual with works of that diameter as to make it probable that at least one half has been removed and employed in filling up the ditches.

It is not easy to gather from the account of the siege a clear idea of the disposition of the parts of the castle. There were two wards, and the outer, judging from its contents, must have been of considerable area. It probably included the inner ward and the mound, and abutted upon the river. The barbican would scarcely be placed upon the river or outside the town, and probably was to the north-west, or near the church of St. Paul.

The inner-ward wall probably surrounded the mound, on the outside of its ditch, and was thus open to attack when the outer ward was taken.

The old tower, last taken, and the fall of a part of which reduced the garrison to surrender, was probably the donjon or shell crowning the mound. This would be of Norman date, and therefore might well be called the old tower, as distinguished from Falk's additions, and the repairs after the siege by Stephen. Thus, if the explanation be accepted, Bedford Castle had a shell keep or donjon upon a mound, surrounded by a ditch and wall, and this again by another wall, at a greater distance, the principal storehouses and dwelling being, as was usual, in this larger or outer ward.

Mounds of similar aspect to that of Bedford are common in many parts of England, and especially in Bedfordshire. Thus Lysons describes Cainhoe as a mound with surrounding earthworks. Eaton-Socon has a high central mound, and around it a ditch communicating with the river, 24 yards outside which is a second ditch, also joining the river. This was the site of another castle of the Beauchamps, allied to those of Bedford. Risinghoe is a mound with a surrounding earthwork. Totternhoe Castle is a circular mound, about 150 ft. diameter at the base, and 40 ft. high, surrounded by a circular ditch, outside of which are other earthworks. The rectangular camp, 500 ft. by 250 ft. close by, is regarded as Roman. Toddington is composed of a mound and other works called Congerhill. Yielden Castle, a seat of the Barons Trally, is an earthwork, 80 yards square, in the centre of which is a large mound, called Castle-hill. On its west side is a space, 90 yards by 45 yards, enclosed by a bank and wet ditch, outside of which are traces of extensive walls.

In connexion with this style of fortress may be mentioned one hitherto undescribed, in a field known as the Castle Close, in the parish of Cheadle, in Staffordshire, rather about a mile south of the town, and in the grounds of Huntley Hall. It consists of a mound of earth, wholly artificial, circular, 90 ft. in diameter at the top, and about 12 ft. high. It is placed upon ground sloping towards and about 100 yards distant from and about 70 ft. above the Tean brook. Its west front is guarded by a platform about 20 ft. broad, scarped steeply towards the water, and a hedge lower down towards the north, occupies what may have been a line of defence. There are no traces of masonry upon or about the mound save a modern icehouse on the north side. There is no history, but the local name "Castle Close," and the aspect of the mound show it to be a military work. C.

June, 1868.

THE NAMES OF METROPOLITAN STREETS.

A RETURN has been issued by the Metropolitan Board of Works of the streets renamed or deprived of name and the houses renumbered since 1856. The names so altered or abolished are printed in alphabetical order, and form a curious specimen of the littleness of men's minds and the extremely limited extent of their information. The ordinary taste of builders would seem to lie in the adoption of Christian names, perhaps their own or their wives'. Thus we find that the Johns, Jameses, Alberts, Williams, Alfreds, Carolines, Anns, &c., have had a large preponderance. There were no fewer than 25 places having the prefix of Cambridge, 17 of Devonshire, 34 of Gloucester, 100 of John, 26 of Albert, 36 of Park, 23 of Prospect, 36 of Queen, 14 of Richmond, 14 of Rose, 23 of St. James, 18 of Sussex. All these repetitions, to the number of 3,031, have been entirely abolished and altered. The Board of Works, however, have not added much to the euphony or interest of the street names by their alterations; but any name certainly is better than a duplicate. The Board have in their report included the directions given to builders as to the future naming of their streets and numbering of their houses. In future no name is to be used for a street unless with the approval of the Board, and it must be a name consisting, if possible, of one word not already in use in the metropolis in street nomenclature. Only such streets as are leading thoroughfares of considerable length can be designated "roads." Names for terraces, places, or other blocks of houses, and sections of streets, and usually known as subsidiary names, will not be recognised, nor such names as are already in use for provincial towns and postal places. A general index of the names of existing streets has been prepared, and is kept under continual revision for the purpose of ascertaining whether proposed names are already in use. This list contains about 15,000 names, with the names of the parishes in which they are used, and is now being prepared for printing in a separate form and will include the names of new streets sanctioned by the Board.

THE ROMAN MORTAR OF BURGH CASTLE, SUFFOLK.*

A MORE than antiquarian interest attaches to the remains of Roman constructive works in this country from the circumstance that they appear to have withstood the ravages of time much more successfully than most of the Norman and Mediæval architectural monuments reared in much later periods. This superiority has been generally attributed to great simplicity in points of construction, combined with the use of imperishable materials, such as flints and rubble, and to a skilful preparation of the mortar employed to bind the stones together.† I was so much interested by the hard and enduring Roman mortar used in the construction of Burgh, that I was induced to bring away with me a few samples for analysis on the occasions of my visiting the castrum in the years 1863 and 1866. The results of the chemical examination of these specimens are appended, but before proceeding to discuss the question of composition it would seem desirable to indicate briefly the circumstances of their occurrence.

Burgh Castle, Suffolk, the *Garianonum* of the Romans, is situate on an eminence near the junction of the rivers Yare and Waveney, and about five miles from Yarmouth. It is a mural erection in the form of an immense parallelogram of which one side is wanting, being left unprotected on the river front. The massive walls are strengthened at the angles and at certain intermediate positions by towers, or solid cylinders of masonry, which are uniform in height with the rest of the work, *i.e.*, about 15 ft., and measure from 40 ft. to 50 ft. in circumference, being larger at the top, and only in the case of the two corner towers being truly circular in form. The length of the wall on the eastern side, which is perfect throughout with a gate in the centre, I found to be 650 ft., whilst the north and south walls have fallen away in places, but their length may be roughly stated at 350 ft. The appearance of the whole is grand and highly picturesque; the walls, which are of rubble masonry, and about 6 ft. in thickness, are faced with flints and layers of red tiles set at intervals with great regularity, and the contrast of colour is heightened by parts of the work being overgrown with moss and ivy. The flints are arranged in tiers of four and occasionally five courses, and the red tiles invariably occur in triple layers with seams of mortar between. This order of construction is repeated some five or six times from base to rampart, with a cap of flints at the top, and the round towers or abutments present the same construction as the rest of the work. The walls vary in thickness, being, as already stated, generally about 6 ft., and are constructed internally of compact rubble, the stones being large, and the mortar presenting throughout the reddish colour due to admixture of pounded brick, which is considered to be characteristic of a Roman origin. The red tiles are of very fine texture, well burnt and compact, for none of them appear to have been disintegrated by frost; their dimensions are tolerably uniform only as regards thickness, which varies from 1¼ in. to 1½ in., and they extend to various distances within the face of the wall, in some places 12 in. only, and at others nearly twice that depth.

With respect to the probable antiquity of the structure, I have been favoured with an opinion from Mr. C. Roach Smith, to the following effect:—"These fortresses—Richborough, Lymne, Pevensey, and Burgh,—instead of having been built at the early date popularly assigned to them, were erected at a comparatively late period in the Romano-British epoch to defend the coast against the incursions of the Saxons." It would appear, then, that at least fifteen centuries have elapsed since the foundations of these castra were laid,‡ and with the well-authenticated knowledge that the Romans were conversant with the properties of burnt and slaked lime, and employed the latter in making their mortar. We have obviously the means of testing the action of lime and of atmospheric influences upon this hydrate placed in contact with sand and other silicious substances for lengthened periods. It becomes, then, important to ascertain the following chemical points in reference to the hardening of mortars:—

* From a paper by Mr. John Spiller, F.C.S., read at the Norfolk meeting of the British Association.

† *Vide* C. Roach Smith's "Report on Excavations at Pevensey," 1853, pp. 12 and 14.

‡ *Vide* "The Antiquities of Richborough, Reculver, and Lymne," by C. Roach Smith, pp. 153 and 179.

1st. To what extent the hydrate of lime becomes re-carbonated by exposure to air?

2nd. What is the physical condition of the carbonate so produced? and

3rd. Whether in this long interval the silica and lime can directly unite with each other?

Different views on these subjects have been advanced, the prevailing opinion undoubtedly being that the lime never becomes thoroughly re-carbonated, but stops short at a point when a definite combination of hydrate and carbonate of lime is formed; and, secondly, that lime is endowed with the power of attacking sand and other forms of insoluble silica by long contact at the common temperature.*

The conclusion to which I have been led by the chemical examination of the ancient mortars from Burgh, Pevensey, and other Roman castra, is that the lime and carbonic acid are invariably united in monatomic proportions as in the original limestone rock, and that there is no evidence of the hydrate of lime having at any time exerted a power of corroding the surfaces of sand, flint, pebbles, or even of burnt clay, with which it must have been for lengthened periods in contact. Further, that the water originally combined with the lime has been entirely eliminated during this process of re-carbonation, and, this stage passed, the amorphous carbonate of lime seems to have become gradually transformed by the joint agency of water and carbonic acid into more or less perfectly crystallised deposits or concretions by virtue of which its binding properties must have been very considerably augmented. It is proper to state that Messrs. Abel and Bloxam† assign as one of the causes of the hardening of mortars, the formation and subsequent crystallisation of the carbonate of lime.

Analysis of the Roman Mortar from S.E. Tower, Burgh:—

	I.
Sand	54·50
Soluble silica	0·50
Red brick, with some unburnt clay	18·00
Carbonate of lime	25·75
Sulphate of lime	0·15
Carbonate of magnesia	0·08
Chloride of sodium	0·05
Magnetic oxide of iron / Wood charcoal	traces
Water, chiefly hygroscopic	0·92
Total	99·85

Other Samples of Burgh Mortar:—

	II.	III.	IV.
Sand and brick, with a little unburnt clay	72·3	71·4	67·0
Carbonate of lime, &c. (by difference)	27·7	28·6	33·0

Samples II. and III. were taken from the south wall; specimen IV. from the north wall.

SUNDERLAND GASWORKS.

THE Sunderland Gas Company opened their new offices on the 9th inst. They occupy a conspicuous position at the south-west corner of Fawcett-street, and are erected from the design of Mr. G. G. Hoskins, architect, whose design obtained the first premium in a public competition in March, 1867.

Tee style of the building is Gothic, and is dependent for its effect rather upon breadth of treatment of the whole than the elaboration of parts. The materials employed are red pressed bricks, with Dunhouse stone dressings. The whole of the windows and principal entrance-doors on the ground-floor have segmental-pointed heads, those of the doorways being recessed, and furnished with columns of grey Dalbettie polished granite, with carved caps of Dunhouse stone. The south front, or principal elevation, occupies a frontage of about 80 ft. towards the Borough-road, and is distinguished by an oriel window, supported by a stone buttress and shaft of grey Dalbettie polished granite, which is surrounded by a carved cap representing a group of ferns.

On the ground-floor the following accommodation is provided, viz.—public offices, 33 ft. 3 in. by 22 ft.; secretary's office, 24 ft. 4 in. by 17 ft. 3 in.; out-door manager's office, 17 ft. by 15 ft.; metre inspector's office, 14 ft. by 13 ft.; principal or director's entrance from Fawcett-street, 26 ft. 6 in. by 10 ft.; strong rooms, with iron doors, by Chubb; lavatories; water-closets; &c., &c. The first-floor comprises director's room, 33 ft. 3 in. by 22 ft.;—this room has a handsome panelled ceiling and an oak dado 3 ft. 6 in. high, the oriel window forming a good feature; —photometrical and experimental room, 17 ft. 3 in. by 13 ft.; metre warehouse, 35 ft. 1 in. by 15 ft.; book-room; lavatories; water-closets, &c.

The top floor and basement are principally devoted to the storage of materials. The principal stairs and landings are of stone, and the entrances laid with Maw & Co.'s geometrical mosaic pavement. The whole of the furniture for the director's room, and the several offices, and principal landing, is of oak. The marble chimney-pieces have been executed by Messrs. Fisher & Dyson, of Huddersfield.

The contractors for the various works have been as follows:—masonry, bricklaying, and plastering, Mr. James Young, Sunderland; plumbing, Mr. H. Tonkinson, Sunderland; slating, Mr. Robert Preston, Sunderland; carving, Messrs. Farmer & Brindley, of London; carpentery and joinery, Messrs. D. & J. Rankin, Sunderland; painting and glazing, Mr. George Kirkup, Sunderland; ironwork and lamps, Messrs. W. H. Walker & Son, Newcastle-on-Tyne; oak furniture and office-fittings, Messrs. W. Jobbling, Sunderland; S. Atkinson, Sunderland; Kipling & Appleby, Darlington; and Hobkirk, Smith, & Whitecross, Sunderland; bellhanging, Mr. T. Heslop, Sunderland. Mr. Robert Hodgson has acted as clerk of the works.

COMPLETION OF THE BEDFORD DRAINAGE AND WATERWORKS.

THE mayor and several members of the corporation have inspected the waterworks on the Clapham-road. The storage well was also visited, and the level of the water found to be 2 ft. 3 in. above the surface of the river. Several gentlemen tasted the water and pronounced it excellent. The reservoir, a subterranean brick-built tank capable of holding 400,000 gallons, was also examined, and the party remained until the water was pumped in. The main sewers of the town were afterwards flushed, and the party drove off to the drainage works at Newnham, which were also thoroughly inspected. The storage well yields 200,000 gallons every twenty-four hours. It is 60 ft. long, 18 ft. wide, and 25 ft. deep: with this is connected a pumping-well by a heading 60 ft. long and 6 ft. wide. For raising the water there is erected a perpendicular plunger, worked by an engine of 40-horse power, of combined high and low pressure, made by Bevington & Co., of London. This engine will pump 30,000 gallons in an hour if needed. The water is lifted from the well to the reservoir on the summit of the ridge known as Foster's-hill. The perpendicular lift is 150 ft. The rising main is taken across the Clapham road direct to the hill.

The reservoir is cut out of the dense boulder-clay which forms the eastern ridge of the Ouse valley, and as the top-water in it stands 140 ft. above the average level of the town of Bedford, there is pressure sufficient not only to supply all the houses with water, but to throw a jet to the top of the highest building when needed in case of fire. The tank is 64 ft. long and 60 ft. wide, and contains 15 ft. 6 in. of water: in round numbers, it gives an available resource of 400,000 gallons of water, double the quantity required at present for a day's consumption. The roof is supported by columns and arches, all being covered in to ensure coolness, and prevent impurities coming into the tank.

On the visitors leaving the hill and descending the slope to the north end of Tavistock-street, the engineer, Mr. John Lawson, explained that this was the highest portion of the system of sewerage, and gave a practical illustration of the advantage of bringing the water-works in union with it at this point, so as to flush the whole of the drains throughout the town. This can be done at any moment, and perfect cleanliness of the sewers obtained by the mere act of turning on the water at certain points. There are thirteen miles of main sewers, which are all straight, and can be seen through at the manholes when inspection is needed. There are two levels in the system, but they come to one outfall, and provision is made in the upper one for conveying sudden overflows of storm-water into the river. The main sewer on the north side is brought to the left bank of the river and passes along the margin by the premises of the Swan Hotel, and here the surface is utilized: over the main is an embankment 25 ft. wide, forming a fine promenade. At the suburb known as Waterloo the main sewer of the south side of the town is brought in a tube under the river to the main above referred to, and the whole is conveyed straight under the roadway by the side of the river to Newnham, three-quarters of a mile. Inside the walls of the old Priory-mead a tank has been constructed which receives the sewage, which is then raised to the desired height by two horizontal 12-horse engines working centrifugal pumps. From the lift the sewage passes along by gravitation to a field of 54 acres, where it is distributed. A portion of the field is not yet brought into cultivation, but a large breadth is now bearing a fine crop of rye-grass, which has sprung up in a very short time.

The borough treasurer, Mr. James Wyatt, in writing to us on the subject of the drainage, says:—"It is very successful, and a great triumph over the 'dirty party.' I think the distribution of the sewage is a very satisfactory solution of the great question; and that Mr. Lawson deserves credit in the engineering world, as he receives commendation from the local governing body of Bedford. I say this as a disinterested person so far as concerns any connexion with the engineering profession, or with Mr. Lawson personally, although greatly interested in the success of such works everywhere."

HEALTH AND DISEASE IN ROMSEY.

OUR attention has been drawn by the surveyor of the Romsey and Winchester turnpike-roads to the fact that upwards of thirty cases of fever have occurred this season at Romsey; and to the probable cause of this. Some years since the surveyor recommended a plan whereby a constant flow of water at all times down the main sewer of the hundred was obtained, and the health of the community secured, after the removal by the railway company of the canal whereby the sewer was flushed. On the subsequent complaint, however, of a mill-owner, a hatch which had previously existed while the canal water was available, was placed on the sewer, in order to accumulate water for the use of his mill, and by way of flushing the sewer at stated times. The surveyor's plan had been in operation during the years 1863, 1865, 1866, and 1867, in none of which years was there any such fever as there has been since the hatch was replaced. The surveyor, therefore, considers that the replacement of the hatch on the sewer, and hence the cessation of the constant water-flow, are the cause of the prevalent fever. Anyhow proper inquiry is called for.

AUSTRALIAN MEAT FOR THE ENGLISH MARKET.

EXPERIMENTS in the preservation of meat still excite public interest. From New South Wales we learn that an attempt is about to be made by Mr. Mort in conveying a cargo of meat, frozen by his process, from Sydney to England. The process has been for a long time before the public. An instance of the success of the chief process carried on by the Victoria Meat Preserving Company has recently been brought under notice. Two legs of mutton cured by their process were hung in the rigging of the brig *Greyhound*, and remained there six weeks. The meat was afterwards cooked, and proved to be perfectly sound and palatable from the outside to the bone. The Victoria Company supply meat cured in this way at a cheaper price than salt beef. Besides the vacuum or tin-enclosing process, this company salt and smoke dry meat. Their rolled mutton hams are sent to India, Japan, &c. Meat biscuits are also made. The Melbourne Meat Preserving Company still carry on their operations in the preparation of tinned meat, to which they limit themselves. A satisfactory trial of this process has been made by Mr. Welch, in London, of some Australian roast mutton, cured by Mr. Ritchie before his connexion with the company. Mr. D. Medlock's process of curing joints of meat by dipping them in bisulphate of lime has been put to a public trial at Melbourne, where a number of gentlemen dined off roast and boiled legs of mutton, and roast and boiled beef, which had been subjected to the process about three weeks before. The meat was served up hot, and proved to be quite equal to fresh cuts, the gravy being

* *Vide* "Knapp's Technology," edited by E. Ronalds and T. Richardson, vol. ii., p. 396; and *seq.* General Gillmore's "Practical Treatise on Limes, Cements, and Mortars" (New York, 1863), pp. 174 and 166; Mr. G. R. Burnell's "Rudimentary Treatise on Limes, Cements, Mortars, &c.," p. 49.

† "Handbook of Chemistry," p. 296.

retained. Mr. Medlock is desirous of trying to get at the home-market, and a shipment of meat prepared by his process was sent to England by the *Lincolnshire* on her last trip. The result of the experiment cannot be known in Australia for some time to come; but, should it prove successful, a cheap way will have been found of solving the problem which has engaged so many ingenious minds. We may here add that the most convenient mode of preparing sulphurous acid for the preservation of meat on Dr. Dewar's principle is said to be by adding a few drops of sulphuric acid or oil of vitriol to sulphate of soda, the sulphurous acid gas being thus evolved in great quantities.

THE PHYSICAL COMMOTIONS THROUGHOUT THE GLOBE.

THE "BUILDER" was the first to point the attention of the public to the indications, ever and anon occurring, of some tremendous impending crisis, which the activity of volcanoes, the frequent recurrence of earthquakes, and the prevalence of hurricanes, in various parts of the world, seemed to betoken. It now appears that numerous cities in South America have been more or less completely destroyed, shipping wrecked, and twenty to forty thousand persons killed, by a series of terrible earthquake shocks. The country chiefly ravaged is Peru and Ecuador, where, along 3,000 miles of country and coast, property estimated roughly at three hundred millions of dollars has been destroyed. The shocks continued from the 13th to the 16th of August; and it may be that they were not even then over; but it is most earnestly to be hoped that the actual crisis had then come, and that the hidden force which has been so long threatening is now expended. Earthquakes have of late occurred not only in America, North as well as South, and in Europe, but in Asia, and also in Australia. The commotion is evidently cosmical: it has affected the whole globe, north and south, from Iceland to the Sandwich Isles, from Britain to Australia, and east and west, from America to Asia. Perhaps even our strangely arid season, like last year's hurricanes, has had something to do with this cosmical disturbance.

The late Mr. Hopkins, of Cambridge, calculated that the force which produced the great geological rents in the earth's crust was one operating "upwards and outwards from within." Does not such a force denote the expansion of the fluid though encrusted sphere, probably from the centrifugal force of its rotation, by which expansion it relieves itself, so preserving uniform the rate of rotary motion so long as the crust gives way to the force of expansion?

SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.

THE twentieth annual meeting of this society commenced at Williton on the 25th ult., and, the weather being fine, there was a good attendance, including Sir Alexander Hood, bart., M.P., the president for the year, Sir P. P. Acland, bart., Mr. Vanderbyl, M.P., &c. The business meeting was held at the National School-room. The report referred to the labours of Mr. Sanford, in compiling the first volume descriptive of the contents of the Somersetshire caves. Mr. Freeman described the construction of Dunster Church. The officers for the ensuing year were appointed. The meeting was attended by nearly eighty ladies and gentlemen. In the afternoon an excursion left Dunn's Hotel for Bicknoller, Halny old Manor-house, and Stogumber. In the evening an ordinary took place at the same hotel, of which nearly the same number of persons partook.

It was intended to hold the meetings for the reception of papers at the National School-room, but in consequence of the want of accommodation many persons were obliged to return home by the quarter to nine train: these papers were therefore read at the dinner-table. The Rev. Mr. Hugo read a paper on "Ina, the King of the West Saxons," and of his residing in the neighbourhood of Taunton. Mr. Parker then read a few remarks about "Old Cleeve Abbey," where they purposed to go next day.

The members did not go to Orchard Wyndham on Thursday to see Old Mother Shipton's stone, as intended, not having time. They went direct to Combe Sydenham, once the residence of Sir F. Drake; thence to Nettlecombe Court House, thoroughly examining it; and therefrom to Cleeve Abbey, where Mr. Parker again read the paper of the evening previous respecting it. Thence they went to Dunster Castle. The park-gates being thrown open, they drove to a large marquee erected by Mr. G. Luttrell, to entertain them at luncheon, where upwards of 100 sat down, and the society afterwards made an examination of the outparts of the building. On their return, Carhampton Church was visited, and thence home to Williton, where an ordinary at Dunn's awaited them, as on the preceding day.

Next morning, thirty-two members of the society proceeded to East Quantoxhead Church and manor-house, Stringston-cross, Stoke Courcy Church, Fairfield (the seat of Sir P. P. Acland, where the president, the son-in-law of this gentleman, entertained them at luncheon), whence they proceeded to the old manor-house at Dod, dington, the church, and old mines and marble quarries; thence to old Donsborough Camp back to St. Audries, by way of the park, the residence of the president; and so ended the meeting.

OPENING OF THE HOP AND MALT EXCHANGE.

THE new building in Southwark-street, Borough, of which we gave a view in our volume for 1867, page 731, has just been opened for business purposes. It was not publicly inaugurated, in consequence of the unavoidable absence of one of the members of the royal family, who, however, promises that he will consent to officiate on his return to town in November. The building, as already noticed, is situated at the corner of High-street, Borough, in the immediate vicinity of the hop trade operations. It contains an exchange 80 ft. by 50 ft., a subscription-room, 40 ft. by 32 ft., a refreshment department, about 120 offices, 50 stands, 4½ acres of warehouse room, and 1½ acre of vaulted cellarage. Of the offices and stands about half are already let and tenanted, and a brisk application is being made for the remainder. Several suites of auction-rooms adjoin the exchange. The capital of the company paid up is 70,000*l.*; the land is freehold, and cost 60,000*l.*; and the building, erected under the supervision of Mr. R. H. Moore, the company's architect, has cost about 65,000*l.* The figures in the pediment and the whole of the other carvings were executed by Messrs. Frampton & Williamson.

FROM SCOTLAND.

Aberdeen.—Free Gilcomston Church has been opened for public worship. It has been built from designs prepared by Mr. William Smith, city architect. The style is Early Decorated Gothic, the walls being of hammer-blocked granite, with freestone dressings. The front to Union-street includes a main door, and wheel window over it 14½ ft. in diameter. When finished, the height of the tower and spire will be 145 ft., and the base of the tower contains one of the gallery staircases. There are three passages along the area of the church, one in the centre, and one on each side, with a cross passage in front of the pulpit, which is at the north-east end. Easy access is afforded to every part of the church. In all, there will be six exits. The interior length, exclusive of vestibule, is 80 ft., and the width 54 ft. 6 in. Two rows of iron columns run up the full height of the building, supporting the middle roof. At the north end of the building there are provided session-house, vestry, and other necessary accommodation. The contractors were,—mason work, Messrs. P. Bisset & Son, 2,750*l.*; carpenter, Mr. Middleton, 1,546*l.*; plumbers, Messrs. R. Gordon & Co., 160*l.*; plasterer, Mr. Morrison, 89*l.*; Slaters, Messrs. Florence & Kemp, 101*l.* 13*s.*; iron columns, Messrs. W. M'Kinnon & Co. 40*l.* The total cost is upwards of 4,786*l.* 13*s.*

Jedburgh.—The new Commercial Bank now in progress is in the Italian style, and has a frontage of 52 ft., and will be three stories in height. The first story is finished, and the second is being proceeded with. At each side of the doorway are two pillars with composite capitals, from which spring two arches, an inner and an outer. The outer arch, which has a carved male head for a key-stone, spans the whole breadth of the doorway, while the inner one is supported in the centre by another pillar similar to those at the sides, thus forming two small arches. The soffit of the doorway is carved, with representations of oak and laurel foliage. The spandrel is also filled with sculptured foliage. Above the door is a balcony, supported by two ornamented trusses or brackets, and surmounted with a balustrade. Above this again will be a two-light window, divided by a shaft with moulded base and capital. This window is also to be surmounted by a light balcony and plain balustrade. The arches of the windows are round. Along the top of the building there is to be an enriched cornice, surmounted by a balustrade and pedestals. The hewing and sculpture work has been executed under the superintendence of Mr. William Brunton, jun., of Jedburgh. The architect is Mr. Rhind, of Edinburgh.

FROM IRELAND.

Antrim.—The foundation-stone of a new Protestant hall has been laid in this town by Viscount Massereene and Ferrard. The proposed hall, which has long been much wanted, is to be erected a short distance off the road leading from the Northern Counties Railway Station to the town. The dimensions of the proposed building are,—length, 63 ft.; breadth, 42 ft.; and height, 25 ft. It will consist of two committee-rooms, and a large assembly-room, which will accommodate about a thousand people. The building, which is to be erected with block stone, will be in the Doric style, and will have an ornamental front. The plans for the building were prepared by Messrs. Young & Mackenzie, and it is being erected by Mr. William Vance, sen., builder, Antrim. It is estimated the building, when completed, will cost about 700*l.*

Dalkey.—The foundation-stone of Dalkey Harbour has been laid at the Coolamore landing-place. It will supply the want, much felt, of a comfortable landing-place, besides being adapted for the reception and unloading of vessels of small tonnage and fishing craft. Two piers, in accordance with a plan drafted by Mr. B. B. Stoney, C.E., of the Dublin Port Board, will extend, the one at the north side about 150 ft., and the other about 50 ft. into the sea, and will embrace an area of about half a mile. The cost will be about 2,000*l.* It will be built of granite, which will be obtained from excavations in the hill close by. The contractor for the work is Mr. John Cunningham, of Dalkey, who has engaged to complete them in six months. They will be superintended by Mr. Stoney, on the part of the Port Board, and by Mr. Quirk, on the part of the Dalkey Commissioners.

Skerries.—A new church has been erected in and for the parish of Holmpatrick, adjacent to Skerries, the old church having been latterly found insufficient to meet the requirements of the Established Church, besides having fallen into a condition of ill repair; and the ceremonial of consecration has been performed by the Archbishop of Dublin. The site of the new church is close to the old one, and is a donation from Ion Trant Hamilton, M.P., who also contributed 700*l.* towards the building-fund. The edifice is built according to a plain Gothic design, by Mr. James Rogers, architect, Dublin. It is about 90 ft. in length by 25 ft. in breadth. This length includes that of the chancel, which is about 24 ft. by 16 ft. in breadth. The side walls are 17 ft. high, and a very pointed roof gives an elevation of at least 17 ft. more at the centre within. Close to an entrance-porch rises a square tower on the north-west angle, surmounted by a broached octagonal spire. The material used in the building is chiefly limestone, from the Milverton quarries, and also from quarries at Athlone. The side walls are each pierced with one triplicate and two duplicate windows. A second external porch on the same side with the other leads to the vestry-room. The interior is plain. The seats are in the most modern style, and, as well as the roof, are of varnished deal. Opposite the chancel a gallery has been erected at the private expense of Mr. H. H. Woods. From the ceiling depend two Mediæval chandeliers, supplied by Messrs. Sloane & Co., of Dublin. All the buildings and fittings have been executed by Mr. Walter Doolin, also of Dublin.

SCHOOLS OF ART.

A Swindon School.—A local committee has been formed to establish a school of art in this town, and the use of the Great Western School-room has been granted for this purpose. Sir Daniel Gooch, bart., M.P., and Mr. A. L. Goddard, M.P., are patrons of the Swindon School; Mr. J. Armstrong, chairman; and Mr. Miller, the very successful master of the Cirencester School, will be the art-teacher. It is proposed to open the school on Tuesday, the 6th of October next.

The Salisbury School.—The annual distribution of prizes to the students of the Salisbury School of Science and Art has taken place at the Council-house, the mayor (Mr. S. Eldridge), being chairman on the occasion. Amongst others, the master of the school, Mr. Fraser, addressed the meeting. The school, he said, though but in its infancy, was progressing hopefully.

THE SEWAGE QUESTION.

EXPERIMENTS are now being made at Tottenham with a mode of treating sewage called "the German system," which is in practical operation at Berlin, Hamburg, and Potsdam; but is, nevertheless, appropriated by the experimenter, who declines to publish the nature of the ingredients used for the precipitation of the sewage and clarification of the water holding it in solution and suspension. Surely there could be no difficulty in obtaining the information for behoof of the public from Hamburg or Berlin.

The plan adopted is to allow the sewage to run continuously through a pit of about 50 ft. long, 20 ft. wide, and 10 ft. deep, running in at the same time one two-thousandth part by weight of the disinfecting agent; the result is said to be that almost the entire quantity of solid matter, say one and a-half thousandth by weight of the fluid sewage, is precipitated, its volatile parts fixed, and the water allowed to flow away from the further end of the tank clear in appearance, and almost without smell. The disinfecting fluid consists of nine parts water and one part composed of three simple substances, which any one may see employed at Tottenham, but the composition of which M. Hillé, C.E., the experimenter, declines to give to the general public.

From the data supplied we understand that the solid ingredients used in this process cost about 20*l.* a ton; so that in the proportion in which they are employed, they would cost about one farthing per ton of liquid sewage deodorised, or 11s. 9d. a ton for the solid matter obtained. The effect of the agent, setting cost aside, is considered to be successful, settlement taking place with surprising rapidity, and deodorisation being almost complete.

A conference has been held at Leamington on the sewage question. The committee of the Milverton, Lillington, and Leamington Local Boards met at the townhall, to further consider what steps shall be taken for the purpose of disposing of the sewage of the three parishes. At a previous meeting the committees adopted the principle of irrigation, and now resolutions and letters were produced, showing that each Board acquiesced in the decision. The following resolution was unanimously adopted:—"That it appears to the Sewage Committee of the three Boards that it would be for the advantage of the district if the three parishes were formed into a united district for the purpose of sewage utilisation." The meeting then adjourned.

THE SUBWAYS ACT.

THE new "Act to make provision respecting the use of subways constructed by the Metropolitan Board of Works in the Metropolis" (which is a "local" Act), has been referred to in several journals, but an analysis of its clauses has not yet appeared. As it is a subject of special interest to our readers, we present a carefully arranged outline.

The Act commences by reciting the construction of subways in the new streets which the Board are authorized to make; and that it is expedient, in order to prevent inconvenience to the public by the frequent breaking up of such streets, to enable the Board to require companies, when placing gas, water, and other pipes, to lay them in the subways. To effect this it is enacted that the Board may serve a notice on any company going to lay down pipes, requiring them to lay them in the subway; and the company must do so, notwithstanding anything in any special or general Act. After the receipt of such notice the company must not break up the street. The penalty for disobedience is to be 20*l.* (without prejudice to other proceedings), and the pipe may be removed and surface made good at the expense of such company. Pipes already laid in streets under which a subway is made, must be removed into the subway; but this is to be at the cost of the Board. If, however, it seems necessary to substitute new pipes for the existing ones, the cost is to be fairly apportioned. Differences are to be settled by an arbitrator appointed by the Board of Trade. All companies or persons are to be allowed to use the subways without favour, so far as space will admit. The companies are to maintain the pipes, under the supervision of an officer appointed by the Board; and the subways are to be maintained by the Board in an efficient state of ventilation and repair, and to be free from water and other obstruction. The Board and the companies are to agree as to the pecuniary and other details connected with supervision; and in case of any difference, it is to be settled by an arbitrator appointed by the Board of Trade, on the application of either party. The powers of the Local Management Acts are to be applied to this Act. No bye-laws under this Act shall come into operation until allowed by the Board of Trade, and twenty-one days' notice of the intention to apply to the Board of Trade for the allowance of such bye-laws, shall be given to the gas and water companies supplying gas and water in the district. The Act is only to apply to subways constructed under the Covent Garden Approval and Southwark and Westminster Communication Act (1857); Victoria Park Approach Act (1858); Thames Embankment Acts (1862, 1863, 1864); Metropolis Improvement Act (1863); and the Whitechapel and Holborn Improvement Act (1865).

PARIS.

M. VIOLLET LE DUC'S small building, constructed at the south of Notre Dame, as a residence for the arch-priest and beadle, is terminated. It is in the style of the French "Modern" Gothic, with square-headed windows and high-pitched roof. The enormous works of restoration of the Cathedral are drawing to a close, and the iron railing surrounding it progresses rapidly. Some important experiments have been made lately for playing the new grand organ by electricity, in adapting to it the system of apparatus invented by Lauenberger & Co. of Sumiswald (Switzerland), and presented to the Society of Encouragement by M. Spiess, a member of the above firm, in the shape of an electric piano. We attended by invitation at a rehearsal at Notre Dame, and had an opportunity of examining the mechanism of the apparatus. Several pieces from the "Traviata," "Trovatore," the March in "Norma," &c. were well played on the grand organ in good time; and also Handel's "Creation," the "Domine salvum fac," &c. &c. The great difficulty is to contrive a battery which will remain with closed circuit in constant action for two months without diminution of force. Daniell's battery improved by M. Boulay, is likely to effect this, as he has one working an electric clock, which has not been disturbed for a month, and though the circuit is always closed, no weakness has been observed in the current.

The double syphon for conveying the sewage of all the south side of Paris, to join the great northern collector, discharging at Asnières, was finally sunk on the 31st ult., into its channel in the bed of the Seine, near the Pont de l'Alma, without accident. The channel receiving the tubes is 5 ft. deep; the tubes are 3 ft. 3 in. each in diameter, and rest on a layer of concrete 16 in. thick. Another layer is to cover them 19 in. deep. The syphon is 407 ft. long, and it weighs 150 tons. As soon as it was laid the sunk towing-chain in the river, which had been severed, was again united, the towage and general traffic of the river was resumed, and the fly-boats resumed their active service.

At the church of Saint-Germain-des-Près, the new "place" of that name, through which the Rue de Rennes passes, has been completely put into shape, and will measure about 30,000 square feet. A refuge has been placed in the centre. Repairs are being executed to restore the north-west corner of the old church tower, found to be, on its being disengaged, in a sad state of degradation; the counterfort has to be entirely renewed. There were formerly three towers to the church, two placed at the angles of the choir and transept, and that standing at present. All three were capped with steeples, which gave it the nickname of the *three-steepled church*. About forty-five years ago the two towers at the transept, threatening ruin, were taken down; but the lower portions were allowed to remain as they do at present: it was deemed unsafe to remove them as they serve as counterforts.

THE TRADES MOVEMENT.

A MEETING of masters and workmen in the building trade of Nottingham and district has been held in the Exchange Hall there, for the purpose of forming a board of arbitration in connexion with the trade. A resolution was carried—"That this meeting is of opinion that it is very desirable that a board of arbitration and conciliation should be formed in connexion with the building trade of this town and district." Mr. Mundella stated that there were already 500 boards of arbitration established, and there were 200 candidates for the coming Parliament who had adopted it in their electioneering speeches, and who were going to the House of Commons on this principle; that workingmen have a perfect right to combine for their own protection; and that the funds of working men ought to be protected just as effectually as the funds of life insurance or any other society which belongs to the middle and upper classes. The following were appointed on a committee in connexion with the joiners' and carpenters' branch:—Masters: R. Dennett, Lynam, Barker, Vickers, Stevenson, and H. Marriott, sec. Workmen: Messrs. Ellis, Rowland, Martin, Hutchinson, Drury, and Hicking, sec. In reply to a vote of thanks awarded to him, Mr. Mundella said he hoped their example would be followed throughout England, and that one day he might see a reunion of boards of arbitration in Nottingham. He expressed his belief that the masons, although slow in their movements, were coming right.

At a recent meeting of the Liverpool Trade Union of Operative Bricklayers, held in the Concert-hall, Lord Nelson-street, it has been unanimously resolved to request the Master Builders' Association to join them in settling a permanent code of regulations which shall be satisfactory to all parties, through a court of arbitration, as suggested by the masters in May last. A resolution was also passed in favour of conducting the business of the society in its own offices, instead of at a public-house, as heretofore.

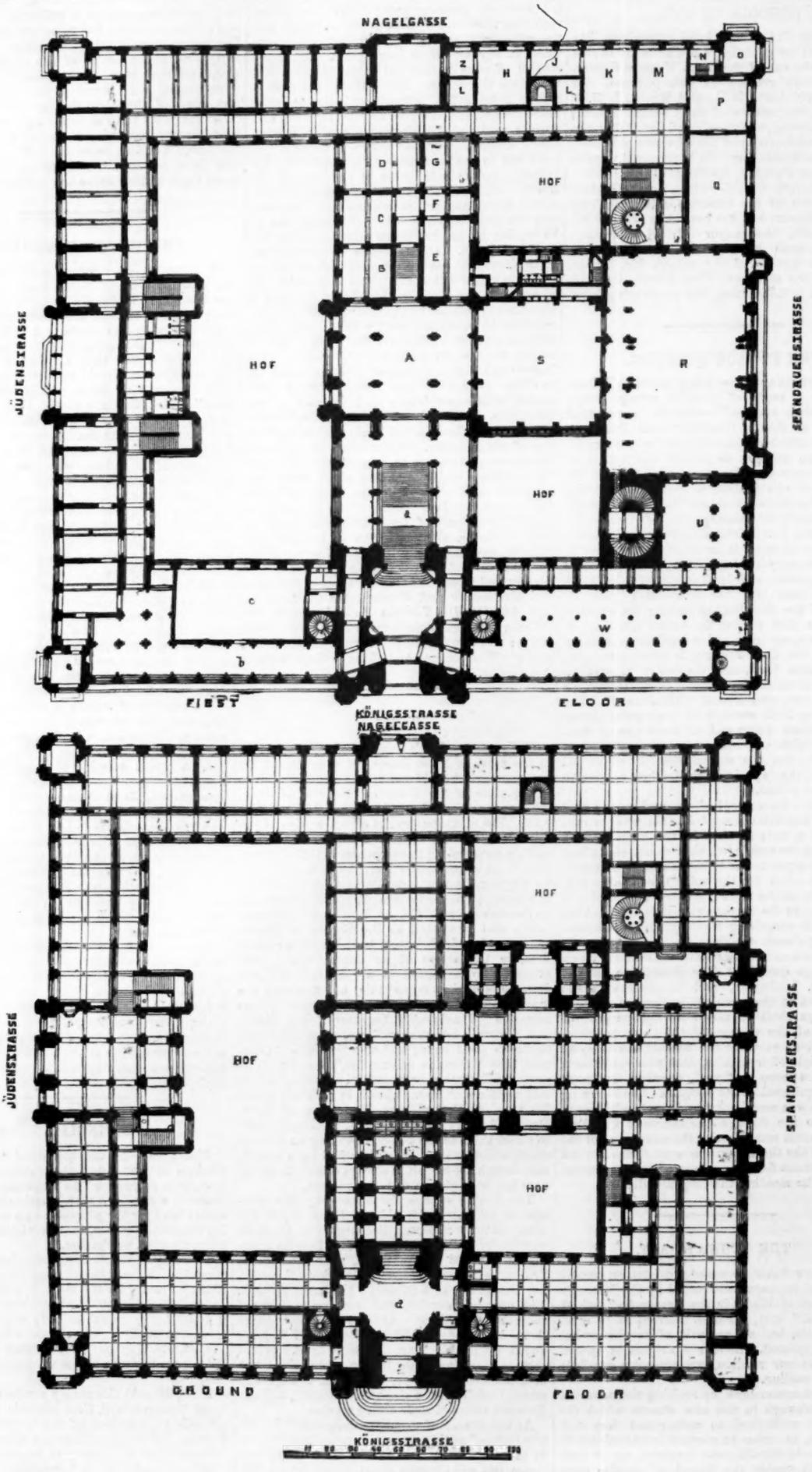
Several mill operatives at Lewiston, U.S., are building houses in their spare hours. Working in the mills nearly twelve hours per day, they manage to secure a little time in the morning before the bell rings and after they come out at night, which they devote to building operations. A short time ago one of these persevering men was seen shingling after eleven o'clock at night, and the next morning was at work almost before daylight.

PROVINCIAL NEWS.

Blackburn.—At the adjourned annual county sessions at Lancaster, the Finance Committee have been empowered to negotiate for the purchase of a site for a new lunatic asylum, and to secure land for the purpose to an extent exceeding immediate wants, in the vicinity of Blackburn, Chorley, or Preston.

Dewsbury.—Mr. J. Day, a member of the town council, with the object of promoting the erection of an infirmary for the town, has offered to subscribe 2,500*l.* if 50,000*l.* should be raised; 2,000*l.* if 40,000*l.* only be subscribed; and so on in proportion to 20,000*l.* Should the effort be accomplished, Mr. Day promises further to subscribe 50*l.* a year towards the maintenance of the institution.

Kirkdale.—At the county sessions in Preston, it has been resolved, that towards the carrying into effect resolutions of the Courts of Annual Session, 1866, authorising the General Finance Committee of the county to borrow 35,000*l.*, for altering, enlarging, and repairing the county prisons at Preston and Kirkdale, to approve of the mortgage of the rates for these purposes for the sum of 8,000*l.*



NEW TOWN HALL, BERLIN.

BERLIN TOWN HALL.—HERR WAESEMANN, ARCHITECT.

THE NEW BERLIN TOWN-HALL.

BERLIN, after something like 600 years of struggle, has risen, from the humblest beginning, from the position of a simple fishing village, to be the seat of a powerful government, and the capital of all North Germany. Berlin contained at the commencement of the last century, 55,000 inhabitants, at the end of it 169,000, and in December 1867, 703,000, thereby taking rank amongst the largest populations in Europe; whilst the increase of building during the last ten years, has not only placed it on an equality with, but even in advance of, many capitals of much longer standing.

About the year 1850, the council-house, situated nearly in the centre of the city, being found utterly insufficient for the purposes of government, it was determined to remedy the evil by erecting a splendid building, and thereby provide at the same time a worthy and lasting monument of the increased importance of the city. The first thing, however, to be done, was to increase the irregular, confined, and cramped site, which, on account of the high value of the surrounding land and buildings, was only accomplished by an outlay of nearly a million thalers.

The architectural competition, invited by a circular issued in 1856, created an active interest; but although the prize designs were highly praiseworthy, no definite selection was made from them. Mr. Architect Waesemann was then ordered to prepare a design, with the use of the best designs already sent in; and this, after a careful supervision by a professional commission, was approved and put into execution by the authorities. On the 1st of August, 1860, part of the ground was cleared and ready to be given over to the architect, and all was ready for the triumphal laying of the first stone, in the presence of the king, on the 11th June, 1861. On the 1st of April, 1865, by great press of work, the contract made at the beginning, viz., to have ready for use that portion of the building next the Juden and König streets, and the Nagelgasse, was fulfilled.

The rapid progress of the building of the tower (nearly 300 ft. high) now showed the technical necessity of pushing forward, as much as possible, the König-street front, and the second part of the building generally. The external portions of this, consisting principally of reception-rooms, and large handsome apartments, are now nearly finished, whilst the interior will probably take about two years to complete.

The whole building, of which we give a view as if completed, and plans, will without doubt take a most prominent and important position amongst Berlin edifices; and through the perfection of the artistic brickwork introduced by Schinkel, an epoch in Berlin's building history has been created. The stately building rises from massive foundations of grey Silesian granite, in well-designed blocks of brickwork, the dark red tone of which is varied and lightened by mouldings in granite, and window ornamentations in red sandstone. The complete rectangular ground-plan is 310 ft. long by 295 ft. broad, with a height in the ground-floor of 16 ft., in the first-floor 14 ft., in the mezzanine-floor 14 ft., and in the second floor of 16 ft., the front reaching an actual height of 85 Prussian feet. The employment of space is as follows:—

The basement, including the cellarage of the two small yards, contains all along the König-street front, the "Rathkeller," so often found in old German towns, dwelling-rooms for under-servants employed in the building, and space for the hot-water warming apparatus and storage of fuel.

In the *ground-floor*, which is traversed by a handsome corridor, running from the Spaandauer-street to the Juden-street, besides the space set aside for the service, are placed the fire-offices and treasury; and it having been found necessary to protect the doors and windows, an iron ornamental wrought-iron grating was provided. Light, roomy, fire-proof passages and vestibules, which are well warmed in winter, form the means of convenient communication for servants and the public on all the floors.

The *first*, *mezzanine*, and *second floors*, contain offices for the government of forests and landed property of the city, the direction of churches, schools, charities, trade, and the building commission. For those branches of the government which come under the jurisdiction of the civic authorities only, the large council-chambers necessary, as well as a large designing-room for the building commission have been provided on the second floor.

The transport of papers, &c. to the upper floors is effected by means of lifts. Gas, water-supply, closets, &c. are arranged with all the latest improvements, and the greatest care has been paid to the security from fire, in that every compartment, divided by fire-proof walls, is well supplied with hose, and spacious water-tanks under the roof. Most of the apartments are vaulted, the corridors and floors are nearly all paved, and the staircases constructed in granite.

The connexion between the reception-rooms and principal council-chambers is as follows:—

The public steps at the principal entrance lead through the dome, *a*, which terminates in a star-shaped vault, after passing through three floors, and then on to the grand staircase, which forms the approach to the hall, A. From here one ascends by the state staircase, lighted from above, and of which the walls are ornamented with frescoes, to the chambers destined for public meetings, B, immediately adjoining which are the council-chambers, C, D, and E.

On leaving the hall, A, and going to the right, is the court of the city authorities, S, which is supplied with a lofty gallery for the use of the public during session. In close proximity with S is R, the noble principal room, which runs up through all the floors, and is used for receptions on grand occasions. It is rich in architecture, and forms a sort of two-storied arcade, the gallery being connected with the ground by alternated twisted columns and pillars. The walls are painted in gold and light colours, and a rich parquetry floor helps to make up a harmonious whole. The high vaulted hall, U, forms the means of communication by a circular staircase, with the largest passage connected with the State staircase, and leads immediately to the library, W, with its minor rooms. A corridor, finely decorated with historical frescoes, runs through the tower to the hall, *b*; *o* is the magistrates' court, already completed, and imposing from its stately solidity; *e* is a room for the oberbürgermeister; and above it, in the mezzanine floor, is a similar one for the bürgermeister. The rooms Z, L, H, and I to Q, on the first floor, and others on the mezzanine floor, are used, with necessary corridors and staircases, as dwellings for the principal officials; but in case that at some future time it should become necessary to abolish such dwellings, they have been planned and constructed in such a manner as to allow of their being turned into offices.

To conclude. The cost of furnishing, and decoration by gilding and paintings, will bring the whole cost of the building to about four million thalers. Something like 800 officials will be employed in the various offices.

CLEMENT'S INN.

SOME of the members of the Inn are afraid our paragraph last week may lead to the impression that this Inn has ceased to exist, which is not the fact. The Commissioners of the Law Courts have only taken a small portion of the buildings. Mr. Fairfoot, as one of the senior members of the Society, and as representing a firm which has occupied chambers there for nearly half a century, writes,—"The status of the Society as an Inn of Court is not affected, and the present members entertain a confident hope that a new and appropriate edifice will be erected on or near the very important site they still possess, where the Society, which has been in existence at least 300 years, will continue to flourish for many future generations."

EDUCATION.

THE elementary principles of all useful arts and sciences should be sown broadcast among the people; indeed such matters, besides simple reading, writing, arithmetic, and catechisms, should be taught alike to growing boys and girls in the schools of the rich, the middle-class, and the poor; for the truths of natural philosophy are not abstruse but plain, even to the understandings of intelligent children, when they are expressed in simple and familiar language, and illustrated by clear drawings and proper models. If such things were taught at schools with care and persistence the minds of the recipients would be expanded and trained to right principles; sound knowledge, that would be useful to them in after life, would be acquired, and develope with their growth; and they would, by such knowledge, be brought to perceive and understand more of the attributes, omnipotence, and boundless beneficence of the Creator. In this way, as ignorance and irreligion die out, useful art-and-science-knowledge, combined with true religion, would fructify, and be matured in coming generations. The time has arrived when useful-knowledge-schools should be established in every parish, when the people should be *obliged* to send their children to them, and when equalized educational rates should be levied to defray the expenses. It is singular what little technical knowledge is taught at schools, and at many schools much that is taught is worthless. The deplorable ignorance among the working-classes is due chiefly to the elimination of art-and-science-knowledge from the teachings at schools, and to the indifference with which such knowledge has been treated in its relation to religion. The non-education of the people is a disgrace to the age; for there are vast numbers of men and women, of grown boys and girls, and of children in the metropolis, as well as in all large cities and towns, whose ignorance is so intense, and whose means of existence are so precarious that they live in a state of semi-barbarism, and are ripe for any crime and mischief. With the majority of these plunder is fair game, and crime is a rule. But establish schools in every parish, teach the rising and coming generations really sound and useful knowledge, and open up for them fields for thought and for labour, then right principles would be fostered, industrious habits would be acquired, and crime and pauperism would be diminished.

JOHN PHILLIPS.

LIGHT AND COLOUR.

THE discussion on the science of colour, which you have permitted in the columns of the *Builder* for these several weeks past, is a very valuable opportunity for ventilating the subject, as I am more than ever convinced that a deeper and clearer understanding of the two great hypotheses of light and colour must supervene ere we shall have an enduring and thoroughly useful æsthetic theory propounded; for the language generally used in speaking and writing upon this topic is inconsistent with those hypotheses, and too often expresses erroneous notions formed on our first and false impressions derived from the sense of sight.

The two hypotheses which for some time divided the scientific world, were the corpuscular (Newton's), and the undulatory (Huyghens's). But the advocates of the former are few indeed, if any; and the latter is now generally accepted as the true theory. Sir John Herschel thus describes the reason of its acceptance:—

"An analogy subsisting between sound and light has been gradually traced into a closeness of agreement, which can hardly leave any reasonable doubt of their ultimate coincidence in one common phenomenon, *the vibratory motion of an elastic fluid*. Any æsthetic superstructure raised upon a Newtonian foundation, therefore, will be insecure. But there is one important point in the Newtonian hypothesis which may serve as a stepping-stone to a clearer view of the fundamental principles of the subject, viz., that it does not suppose the different colours to be inherent in the fasciculi, or bundle of rays, producing, according to this system, the effect of white light; but that *the velocity of the atoms* of each fasciculus, or ray, determines the particular sensation of colour which we experience on its impinging upon and disturbing the retina, as will be plainly perceived from the following authoritative statement of the hypothesis: 'it is a *difference of velocity* in the particles which produces *in the eye* the sensations of different colours.'"

It is therefore inconsistent, according to this statement, to talk about coloured rays, or to talk of colour as if it had an objective existence out of and independently of the eye: the hypothesis only postulates the externality of *rays of force*.

The undulatory or received hypothesis which supposes the production of light and colour to be analogous to that of sound and music is, however, totally different from the *emissive;* a solid superstructure consequently cannot be built partly upon one, and partly upon the other: we may test either, if we please, and wait till we are convinced of the truth of one of them before attempting to construct the æsthetic portion of the science, which should of course be a deductive sequence of the first principles of the adopted hypothesis. To contend that yellow is a "secondary," is not to make a new theory; all that we can do is to show whether this view is more consistent with the received hypothesis than that formerly taken. It will be evident then that if we do attempt to build up the artistic portion of the science one or other of the famous hypotheses must be chosen; and I accept,

in common with the majority of thinkers, the *vibratory* as the true theory. But the *undulatory* is as innocent as the *corpuscular* hypothesis of postulating the external objectivity of colour; the vibrations of the elastic medium only become light and colour in conjunction with the retina, just as the pulsations of the air become sound in conjunction with the auditory nerve; and people who do not think deeply on these subjects erroneously believe in the external objectivity of sound as well as of light and colour.

Thus we may proceed a step further, and show that the compensating spectra your correspondents so frequently refer to *have no external existence whatever*, but are merely states of reaction of the retina within the eye itself; for it is clear if they had, another person would be able to see the spectra, though the wafer were hidden from view: and that this is not the case has been repeatedly proved by experiment. Every colour, therefore, may be raised in the eye as a compensation to some direct excitement of the retina from without, independently of any external and corresponding vibration; the retina in this way balancing its disturbance by the external rag.

Now, as there may be infinite variation in the external vibrations, which produce "*in the eye*" all the variations of colour, we may inquire why one colour should be dubbed "primary" in preference to another? There would appear to be two reasons, either for *marked or distinctive difference*, or *the impossibility of blending any two vibrations to produce that particular sensation of colour*. Yellow, for instance, would be a "primary" by *distinctive difference*, and "primary" also if it cannot be compounded in the way suggested. "Primary" and "secondary" are not entities, and every colour is a compensation to some other.

Now, although accepting the *undulatory* theory in the main, I do not accept some of the notions imported into it from the *corpuscular* hypothesis; as, for instance, separate vibrations, as of separate fasciculi, issuing from the sun, but in a general vibratory motion of the elastic medium, which, modified by the prism or other means, produces in us all the varieties of light and colour. This I hope soon to have the means of demonstrating: it has indeed been demonstrated over and over again, had the significance of the fact of the reconcentration of the rays of the spectrum been duly appreciated; for, when the various vibrations are thus recombined, they produce one homogeneous action, and the sensation of white light.

According to the received theory, the analogy between music and colour is no longer a fanciful conjecture, these as well as other phenomena pointing to a science of proportion underlying all nature as the basis of harmony which I am endeavouring to work out.

W. CAVE THOMAS.

P.S. — To work out the æsthetic theory scientific artists should unite their endeavours with those of Professor Tyndall.

STREET LIGHTS.

I SHOULD like to occupy a small space in your paper on the subject of street lamps. I think every one will allow that throughout the metropolis they are in a most defective condition. There is hardly a capital in Europe where the lamps are so neglected. Why I wish at this moment to intrude upon you is that we are opening large and important thoroughfares, in which I wish to see suitable lamp-posts erected, a design which will assist the effect of the street architecture. On the new embankment, as far as I can understand the plan, it is proposed to place standards on the granite wall; if so, I think it will require an unusual treatment. The lantern should be brought out from the lamp-post by an arm bracket. The lantern, at least the lower part, should be spherical, in one piece, without any framing, so that the light may be thrown on the pavement without shadow. The upper half may be any form, but the material should be opaline glass, which acts as a reflector, and it also gives a more brilliant appearance to the street than a metal cover. The opal glass could easily be kept clean. The base of the lantern should not be more than 10 ft. from the ground, and the distance from lamp to lamp about 25 yards. There is at present, I observe, an experiment in Piccadilly, of three lamps, but they all have their lantern framing too heavy, especially the base, throwing thereby a deep shadow. The Paris post and lantern are good: some specimens may be seen in London. There are two in Oxford-street; and in the Duke of Buccleuch's carriage-drive they are in use. In the *Builder*, some two or three weeks since, a large lamp was figured; and, taking the dimensions from your account of it, it appears that the centre lantern is 25 ft. from the ground. That is a great waste of light, and at such a height it becomes certainly inconvenient, if not dangerous, to the lamplighter. More might be made even of our present lamp-posts and lanterns. Why should the former be painted white? It seems to mock the light of the lantern, which surely ought to give light enough to show the lamp-post. If they are not white, the colour selected is pea-green, as in St. James's-square. The lanterns, too, are not only heavy-framed, but are again placed in an outer cage, so that there are eight lines to throw a shadow. The putty, again, is smeared over the glass, to assist in obscuring the light. A square frame is not the worst form of lantern, but a polygon is an absurdity; the height of which seems to be in the lanterns of the Guards' Memorial, where the frame obscures the light entirely. A. B.

CAMPANOLOGY.

SIR,—Allow me to send you a note on the celebrated peal of St. Bride's, Fleet-street. Thanks are due to Mr. Walesby for his labour in supplying such interesting particulars of the bells. In addition I wish to record it on your pages, that the *two trebles*, added to the peal of ten in 1719, were presented to the parish by the two Societies of Ringers, the College Youths and the London Scholars; the latter ancient society having afterwards assumed the new name of the Cumberland, in 1748, after the victory of Culloden, and in honour of the Duke of Cumberland, who presented the then London Scholars with a gold medal on the occasion of their ringing the bells of Shoreditch Church when he entered London that way on his return from Scotland.

After the bells of St. Bride's were augmented to twelve, the College Youths rang, in 1726, the first peal of Bob Maximus, or all twelve in. Among the performers were several gentlemen; and I was told by Mr. Osborn, a late secretary, that it was very commonly reported by the old ringers that every one who rang in that last-mentioned peal left the church in his own carriage; and also that when St. Bride's bells were first set up, by the Rudhalls, and for some years afterwards, Fleet-street was thronged with the carriages of gentlemen, who came from far and near to listen to the ringing; the bells were considered the greatest novelties of the day. Benjamin Annable was a noted composer and ringer, and a College Youth at the above date. I have in my possession a thick octavo MS. full of peals most beautifully written by him, from three to twelve bells. John Hardman, too, of 37, Fleet-street, was a celebrated ringer with them. It would be well if other gentlemen and respectable Londoners of the present day would take more interest in the noble and manly science of ringing (I lately heard two Etonians say that cricket is a farce to it), and associate themselves as members of one or other of the old societies of clever ringers, whose masterly performances may still be heard weekly at their respective churches.

H. T. ELLACOMBE, M.A., College Youth.

THE STONE OF THE PARLIAMENT HOUSES.

SIR,—We are now told by Mr. Abel, the chemist appointed to examine into the matter, "That of the processes employed, not one has proved successful in arresting or preventing the decay of the stone." A very conclusive declaration, no doubt, and sufficiently decisive to arrest public inquiry. * * * In his report, Mr. Abel very affectedly speaks of the decaying stone by the name "dolomite." I say he so speaks *affectedly*, because, as a chemist, he must know that the proper name of the stone is magnesian limestone; and, as I shall hereafter show, it is just because it is a magnesian limestone (a compound of magnesia and lime) that it is decaying. The word "dolomite," I may remark, was formed many years ago, in the infancy of science, by torturing, *more geologico*, the name of M. Dolomieu, a French *savant* of that period. But as a clear comprehension of the cause of the evil will be greatly facilitated by the knowledge that the stone in question is composed substantially of the carbonates of magnesia and lime, I throw the dolomitic distortion overboard, and adhere to the name magnesian limestone in my remarks. In Mr. Abel's opinion, the "principal cause of decay is the lodgment of water," and therefore he advises us to protect the projecting surfaces "either with a light metallic covering or with some other sufficiently impervious coating." This kind of advice has at least one merit, it is sufficiently impervious to argument; for we are left in utter darkness both as to the specific nature of the metallic covering and the sufficiently impervious coating. In order, therefore, that I may do no injustice to projects which, it is no demerit for me to say, I do not understand, I will leave Mr. Abel to enlighten the world, and meantime the following observations may prove not altogether uninteresting to the public.

About thirteen years ago my attention was drawn by my friend Mr. Goldsworthy Gurney to a crystalline efflorescence which then presented itself on many parts of the exterior of the Houses of Parliament. Upon examining this efflorescence, I found that it was composed almost wholly of sulphate of magnesia, or Epsom salts; and an extended examination of the building proved to me that, more or less, the whole surface of the new Houses was charged with sulphate of magnesia, which, of course, would be dissolved and washed away by the first heavy fall of rain that might occur. The question which naturally arose upon this was, what is the cause of this destructive formation of Epsom salts under these circumstances? It could not be, as Mr. Abel now asserts, due to the "lodgment of water;" for the cathedral at Milan, the minster and the city walls at York, and a vast number of other public buildings, not to mention St. Stephen's Chapel itself, have all been built with magnesian limestone, and have, nevertheless, resisted the effect of this lodgment of water for many centuries; added to which, the well-known Parian marble is a magnesian limestone, and the same remark applies to the marble of Iona, in the Hebrides, from both of which statues have been sculptured, whose high polish and beauty remain unimpaired after centuries of exposure to the weather. To solve the decaying problem practical experiments were therefore needed, and, in conjunction with Mr. Gurney, I commenced a series. We soon found that water supersaturated with carbonic acid gas had no appreciable effect upon the magnesian limestone, and that to render such water effective it was necessary, in the first instance, to roast the magnesian limestone at a red heat, a plan used many years since by Mr. Pattinson, of Newcastle, for extracting carbonate of magnesia from such limestone. Disappointed in this experiment, we next passed 500 cubic feet of common air through an imperial pint of distilled water; but this water was still without action upon the magnesian limestone. Rainwater collected at Croydon was then tried; but this also was inactive. Distilled water was then mixed with common soot to the consistence of thick cream, and filtered through paper; the clear solution thus obtained was found to act rapidly upon the magnesian limestone; and when portions of it were placed upon a polished surface of the stone and allowed to evaporate to dryness in the sun, minute crystals of sulphate of magnesia or Epsom salts were formed, and the polished surface was found to be highly corroded. It was afterwards demonstrated by analysis that the sooty solution contained sulphate of ammonia in considerable quantity, and that the corrosive effect and production of Epsom salts were due to the presence of sulphate of ammonia in the soot. Hence, therefore, an answer to the seeming contradiction with respect to the durability of magnesian limestone in different localities. The soot formed from pure vegetable matter, like wood, contains no sulphate of ammonia whatever, and it is consequently inactive upon magnesian limestone; but the soot formed from coal invariably contains a large quantity of sulphate of ammonia; and when such soot lodges, as it will do in the cavities of finely-chiselled stonework, a concentrated solution of sulphate of ammonia will drain from it under the influence of the first shower of rain; and this it is, and not the "lodgment of water between string-courses," as suggested by Mr. Abel, which causes the decay. In fact, the whole subject was gone through and explained by me before a Committee of the House of Commons in answer

to questions from Lord Palmerston twelve years ago; and I then said, what I now repeat, that no practical method will ever be devised to prevent the deterioration of the stone.

Within the last forty years the consumption of coal in London has increased a hundredfold, and it is absurd to expect that such a change should bring no inconveniences along with the immense advantages which it has bestowed. And here let me say a few words upon coal soot. It may be supposed, perhaps, that if the formation of this soot were prevented by what is called "thorough combustion," no sulphate of ammonia would be produced. This, however, is not so, for the sulphate of ammonia would then continue to be generated, perhaps even in larger quantities; and it would fall, as it now does, under the influence of the wind and the neighbouring buildings. In other words, the evil would not cease, though the production of this kind of soot were put an end to by combustion, since the soot is only a companion and not a mere vehicle for the sulphate of ammonia. In conclusion, I will briefly explain the mode in which sulphate of ammonia acts upon magnesian limestone. This limestone consists of carbonate of magnesia and carbonate of lime, both of which are decomposed under the sun's rays by the power of sulphate of ammonia, with the production of carbonate of ammonia, which flies away, and sulphate of magnesia or Epsom salts and sulphate of lime, which remain and form an efflorescence upon the surface of the stone.

L. S. D.

MADRAS IRRIGATION.

SIR,—In your No. 1,325* appears a letter asserting that "the Madras irrigation has been a complete failure." As the father of one of the gentlemen employed in the undertaking, who has not the opportunity to reply, perhaps I may be allowed to observe that my son is *not* one of "a lot of speculative adventurers;" but is well versed in the works required of him, *and is progressing satisfactorily* towards the very acme of your correspondent's desires, in effecting "useful land-marks" of a generous and civilizing occupation.

So far is this commendable enterprise from being "an entire failure," as the language of seeming disappointment has laboured to indicate, that (as I have intelligence by this week's Indian mail) portions of earthworks are completed in the Pennair Division, where also the masonry is in full swing; so as to justify the conviction that at least in this district, which is thirty miles in length, a result will issue *from skill and economy actually applied* that must be considered prosperous; and that ought to reassure all parties concerned throughout the broad scope for kindred undertakings. Indeed, I look forward with full confidence to the period when such works, besides being thoroughly remunerative in a commercial sense, shall have a very exhilarating and exalting effect upon the natives of that splendid empire; and I trust that the gracious refreshments, faintly so represented, will at length invigorate their religious susceptibilities, to the glory of the great and true God.

T. CRUSE.

CONCRETE BUILDING.

HAVING noticed a letter in your paper from "G. C. J." (p. 645, *ante*) on the above subject containing a challenge to any one to erect concrete walls at the prices quoted by Mr. Tall; and having had some experience in the construction of concrete buildings; a few facts from me might be of service to him.

I am now engaged as surveyor in erecting a large building on the St. Margaret's estate, Isleworth, intended for a private residence, and the following is the actual cost I am now paying for labour and materials:—

Thames ballast, delivered on the ground, per cubic yard	2s. 11d.
Best Portland cement, per bushel	1 10
Labour, including all plant necessary to mix the concrete, raise it to the scaffold, and fill into the walls, per cubic yard	2 3

and I may add that the contractor for the labour is quite satisfied with his bargain; and, I have no doubt, would take any given quantity of the work at the same rate.

I have erected boundary walls in concrete on the same property, each 118 ft. long, 6 ft. 6 in. high, and 6 in. thick, with a pier at each end only. The total cost was 11*l.*: each wall including a projecting saddle-back coping running the whole length, and caps to the piers. The lowest estimate for wood fencing for the same place was 15*l.* 10*s.*; and for 4½-in. brick, with 9-in. piers, 20*l.*

W. F. HOOPER.

* See p. 474, *ante*.

MESSRS. T. LYTHGOE & H. THORNTON, Manchester, have patented improvements in the construction of walls, &c. This invention consists, first, in lining the wood or other frame or mould into which the concrete is filled with an improved concrete having a hard and smooth surface. Secondly, in forming the outer and inner surfaces of the wall of fine concrete, which is run in between the outer frame or mould and a small inner frame. Thirdly, in certain improved apparatus employed in the construction of walls and other parts of buildings made of concrete. Fourthly, in attaching to the inside of the frame or mould triangular or other shaped projections placed horizontally and vertically, or otherwise, which projections produce corresponding recesses in the face of the building in imitation of the joints of the stones or panels, or other designs; and in making recesses in the mould to produce ornaments or other designs in relief. Lastly, in certain improved modes of constructing floors and roofs with bars of ⊤ iron and concrete.

TO KEEP BRICK WALLS DRY.

SIR,—I have noticed in your paper the letters respecting damp walls. I beg to state that I have tried the application of a solution of soap, followed by one of alum, with great success. This was recommended by you some two years ago. I tried it on the front of a red-brick farmhouse, and it gave such satisfaction that I have orders to continue the dressing every summer. I could not perceive that it in any way altered the colour of the bricks till this year (this being the third dressing), and now only by a slight tinge of white scarcely perceptible. I have great faith in this preparation, believing it is a *certain cure*.

ARTHUR CHAMBERS, Builder.

UNPAINTED DEAL WORK.

SIR,—I have been informed by a London architect of some standing and experience, in whose opinion and judgment I should be disposed to place confidence, that it is not necessary to paint deal timber in external work in order to preserve it, and that its appearance without any paint or varnish is much improved by time. In proof of this he mentions some very ancient doors, made of deal, which have been recently brought from Norway and placed in the South Kensington Museum. I should be very glad if some of your professional readers could be induced to give their opinions, or the result of their experience, on this subject.

PLAIN DEALER.

SCHOOLS OF ART: EDINBURGH *v.* NOTTINGHAM.

SIR,—To studies in the Nottingham School of Art and in the South Kensington Museum, and to the opportunities there afforded me, I owe an acknowledgment at least, as I have been much benefited thereby in my professional career. It is, therefore, but natural that I should evince considerable interest in the various schools throughout the country, and more especially in the one in such active operation in my native town, Nottingham. Hence I have constantly examined the reports of the schools whenever any comparison as to their efficiency has been published, and I have recently had an opportunity of so doing, for the Department of Science and Art has, with very great wisdom, offered premiums to those masters of the various schools throughout the country who, at the annual examinations into the state of the schools, could show the greatest amount of proficiency amongst the students; and the list of awards to those masters has now been published; and the statistics from which these awards have been adjudged have likewise been printed by the Department.

In the award Edinburgh stands first, Nottingham second.

I take exception to this award, thinking, according to the statistics given, that to Mr. J. S. Rawle, the Head Master at Nottingham, the first premium should have been awarded; and as your space is valuable, I will add little more, except to subjoin an extract from the statistics, merely explaining that the number of students in each of the two schools is nearly the same; *that the Edinburgh School heads the list in one item only, namely, the elementary*; while the Nottingham School gained the *greatest number of medals for advanced works*; and, in what may without doubt be considered the most important section of the whole, namely, the annual examination of the Department (the real test of the efficiency of both master and pupil), *the Nottingham School surpassed Edinburgh by double the number*.

The figures subjoined are abstracted from the report printed by the Department of Science and Art, and therefore may be presumed to be correct.

Surely Nottingham and its Master in Art have not had justice meted out to them.

Comparison between the Nottingham and Edinburgh Schools of Art, as regards the honours gained in 1868 in the Medal Competition and Examination, instituted by the Department of Science and Art.

	Nottingham.		Edinburgh.
1. Number of students attending the school	360	.....	404
2. Number of medals national competition awarded for works in the advanced stages of study	8	.....	5
3. Number of Queen's prizes for advanced works	2	.....	2
4. Number of book prizes for works in the elementary stages of study	4	.....	33
5. Number of students who *passed* in the Government examination in drawing, &c.	142	.....	76
6. Number of prizes for great excellence in the above examinations	55	.....	37

The 2nd, 5th, and 6th items in the above list tell their own tale.

S. DUTTON WALKER.

THE WATERING AND CONCRETION OF ROADS.

AT the Norwich meeting of the British Association for the Advancement of Science, Mr. W. J. Cooper read a paper on "The Watering of Roads," in which he thus speaks of the new system of watering with which he is connected:—

"At an expense of about 100,000*l.*, the various parishes of London have been watered this season; but, notwithstanding this enormous outlay, the dust could not be laid; and it is quite evident that the time has arrived when the assistance of deliquescent salts is absolutely necessary to aid in this operation; and, from the results obtained by the use of the chlorides of calcium and sodium mixed with the water in certain localities, there can be little doubt that they will soon be generally adopted.

A patent was taken out in September last for a compound of these well-known deliquescent salts, and for its application to the purpose of road-watering.

The proportions used are 1 lb. or ¾ lb. of the mixed salts to one gallon of water. The salts are put into the cart before it is filled; the water is then laid on; and by the time the cart is full the salts are in solution.

The application of the salts has produced a most important effect upon the surface of a macadamised road, hardening and concreting the material in such a manner that, when it is perfectly dry, no dust whatever arises from the passage of ordinary traffic. The light dust always found upon a dry road surface which is usually watered with plain water is not to be seen, the surface remaining smooth, firmly bound down, with no detritus whatever upon the surface.

In considering the economy of road-making, this state of the road is very important. There is scarcely anything for the scavenger to sweep up and take away; and what has usually been carted away by wagonloads, as waste, remains an integral part of the road; consequently the repairs to the road would be much less frequent, and a considerable saving would be effected. The chlorides employed, being antiputrescent, tend to alleviate the evils arising from organic matter deposited on road surfaces: a sanitary advantage is therefore gained, and the economy in the water is also a favourable feature of this method of watering roads.

The water consumed in watering roads in London is about one-sixth of the daily supply for all purposes; and as, by the introduction of the chlorides, so much less water is required, a saving of at least 75 per cent. would be effected, which is really an important consideration, as this water is required at the hottest period of the season, when the demands for other purposes are more urgent than usual; and the necessity of an increased water-supply is being seriously discussed.

Thus the effect produced by the use of deliquescent salts mixed with the water is not only the effectual and complete laying of the dust, but the collateral advantages of economy in labour, in road-making, and in consumption of water. It also obviates the necessity of Sunday labour in road-watering."

The result of a trial of the new system of watering during this very arid and trying season may be seen in Baker-street, where it is applied once or twice a week. Arrangements are now made, we understand, for the manufacture of the chloride of calcium, in large quantities, all over the kingdom, so that numerous applications for leave to use the patent can now be responded to. The municipal authorities of Calcutta, under the sanction of the Government, are about to test the system in that dust-plagued city.

CHURCH-BUILDING NEWS.

Stinsford (*Dorset*).—St. Michael's Church, Stinsford, has been restored. The chancel floor has been raised 6 in. above the level of that of the nave. Open stalls of stained deal have been placed in the chancel. The east window of the chancel was formerly a plain structure, divested of its tracery, and filled in with common lights in iron framework. It was also blocked up on the interior by the reredos of the Corinthian style in plaster; but this has now been re-opened, and a window of Bath stone constructed after the old pattern, with the perpendicular tracery added. The window, which consists of three

compartments, is filled with stained glass, the subject being the Ascension of our Lord. The old-fashioned lights on the north and south walls of the chancel have been substituted by small windows, with heads of tracery, and filled in with diaper glass. On the south side of the chancel a stained window has been inserted by Mr. John Floyer, M.P. There are two subjects, representing Dorcas and the Good Samaritan. The chancel is separated from the nave by an archway of Early English design. The north aisle, which we understand was enlarged from its originally limited dimensions as a "lean-to" to a size parallel with the south aisle, was erected by some members of the Pitt family in the latter part of the eighteenth century, the structure bearing the style of that period. The old windows, which were of very meagre dimensions and quite plain, have been removed, and on the north wall two windows of chiaroscuro glass have been inserted, the compartments being filled with representations of the major prophets. These windows were supplied by Messrs. Lavers, Barraud, & Westlake, of London. At the eastern end of this aisle a new window of stained glass has also been placed, in which the subjects represented are Faith, Hope, and Charity. Underneath them, as though in illustration of these three great attributes, are representations —of Faith, in the woman having an issue of blood touching the hem of Jesus's garment; Hope, in the Magi offerings; and Charity, in the widow's mite. The perpendicular tracery of the window is filled up with angels bearing instruments of music. This window, together with the three chancel windows, and one on the east end of the south aisle, were given by Mr. James Fellowes, of Kingston House. The latter is a *Te Deum* window, and contains subjects illustrative of the passages, "The glorious company of the apostles praise Thee," "The goodly fellowship of the prophets praise Thee," The noble army of martyrs praise Thee," "The Holy Church throughout all the world doth acknowledge Thee." The tracery of the window is filled with the representations of angels bearing scrolls, upon which the word "Allelnia" is inscribed, the centre light containing the symbol of the "Descending Dove." The two remaining windows in the south aisle are filled with tinted cathedral glass, and were made of corresponding shape with the chiaroscuro lights on the opposite side, both of which are ornamented with dressings of Ham-hill stone. The roofs of the nave aisles and chancel are ceiled, and thus the perpendicular oak roofs are obscured from view: they are so decayed as to preclude the possibility of their renovation and repair. The new vestry is built of Portesham stone, and covered with a roof of stone tiles, to match the exterior of the nave roof. The whole of the stone carving has been executed by Mr. R. F. Chapman, of Bath. The old Perpendicular tower, shrouded in its mantle of ivy, has not been interfered with. The works were carried out under the direction of Mr. J. Hicks, of Dorchester, architect, by Messrs. Wellspring & Son, builders.

Llechgynfarwy, Anglesey.—The parish church has been re-opened for divine service. The new edifice, the style of which is Late Decorated, has the same ground-plan as the former one, with the exception that it has been lengthened to the east, and widened towards the north, the nave and chancel now measuring together 39 ft. 6 in. from east to west, and 16 ft. 7 in. from north to south; the south transept or chapel being 12 ft. 6 in. wide by 11 ft. 6 in. long (internal dimensions). The porch, which is on the north side, has been entirely rebuilt and enlarged. By the lengthening of the building the chancel has been rendered a more marked feature. The nave is lighted by a square-headed window in three compartments on the south, and on the north by an arch-headed traceried window of two lights placed under a small gable to light the pulpit and prayer-desk. The transept is lighted by an arch-headed window in two lights. The east window, which is of three lights, has an arched head with tracery, the whole being filled with stained glass tracery, having the "dove" in the upper part, the Alpha and Omega on the north side, and the sacred monogram on the south. Messrs. J. A. Forrest & Co., of Liverpool, were the artists. The bell-turret is new. The roofs, which have arched principals, resting on stone corbels, have the timbers exposed and lightly stained and varnished. The seats are all open, and with the rest of the internal fittings, are lightly stained and varnished. The church will accommodate 105 persons. The plans, &c., were prepared by Messrs. Kennedy & O'Donoghue, of Bangor and London; and carried out under their direction by Mr. Joseph Hughes, of Llansantffraid Glan Conwy, builder. The total cost has been 540*l.*

London.—The parsonage of St. Michael's, Mark-street, Finsbury, has been laid with Ridgway & Belleroche's tiles. The architect is Mr. James Brooks, of London; and the builder, Mr. Henshaw.

Wembdon.—The parish church of Wembdon, near Bridgwater, which was destroyed by fire in the spring of the present year, is about to be rebuilt, from plans prepared by Mr. J. M. Hay, of Bath. The sum of 760*l.* has been subscribed towards the rebuilding.

Little Ellingham.—The first stone of the nave of Little Ellingham Church has been laid.

Leeds.—St. Clement's Church has been consecrated. The site is on Chapeltown-road, and was given by Mr. Nicholson, of Roundhay, at a cost of upwards of 1,200*l.* The edifice has been erected from the plans of Mr. George Corson, of Leeds, architect. The scheme in connexion with it is an extensive one, as the Board of the Church Extension Society have purchased land sufficient also for schools and parsonage house. The church is so placed as to leave on the north ample space for the latter, and on the south for schools, playgrounds, and master's house. The church may be described generally as consisting of nave, north and south aisles, with open porches at the west end of them, apsidal chancel, with organ chamber on the north side, vestry under the tower on the south side, and chancel. The tower is placed in the angle formed by the south aisle. It has been erected in this somewhat unusual position in order that its proportions may be seen from the principal approaches to the church. It is 19 ft. square at the base, with octagonal buttresses on the angles, that at the south-east being made larger than the others, as it has to contain the stair giving access to the various stages and to the flat roof of the tower. The stages are five in number, the lowest containing the vestry, the third the ringers' loft, and the fifth the bell chamber. The first bell of an intended peal of eight has been cast by Messrs. Taylor, of Loughborough, and will be hung as soon as the tower is completed. The height from the ground to the top of the parapet is 90 ft.; to the top of stair turret, 122 ft.; and 113 ft. 6 in. to the top of the others. The nave is 88 ft. long from the west end to the chancel arch, and 29 ft. 6 in. wide from wall to wall. On each side an arcade of five arches divides it from the aisles, which are each 75 ft. long by 15 ft. wide. These arches are supported on cylindrical pillars of red sandstone from the Dumfries quarries, with moulded bases and caps, the latter being carved with natural foliage conventionally arranged. The arches are of red Suffolk bricks, the springers, keystones, and voussoirs being of stone. Above the arches, on either side, there is a range of sixteen single light clearstory windows, with traceried heads. The west end of the nave is filled in by a window of five lights, its dimensions being 13 ft. wide by 25 ft. high to the crown of the arch. The head is filled in with tracery. The roof is framed with principals, with curved ribs. A ceiling is formed between these ribs, and following their line, it forms a pointed wagon vault. A ventilating chamber is thus formed in the roof, having openings at each end to the outer air, and the curved ribs at the ceiling ridge being framed double, with space between and connecting fillets, the vitiated air escapes into the air-chamber above, and is expelled by the through draught. The aisles have each five two-light windows, with tracery in their pointed arches, each window being set between buttresses. The aisles do not extend up to the extreme west end, the space of one bay on each side being occupied by a porch 17 ft. by 11 ft. 9 in., with inner door admitting to the nave, and a large open outer doorway, with clustered shafts of red sandstone, caps, and bases, and deeply moulded arches. The chancel is divided from the nave by a lofty arch of red brick and stone, carried on pillars of the red stone already described as from Dumfries, with corbels under them, carved with natural foliage. The chancel is 37 ft. 6 in. long by 24 ft. wide, and the east end forms a seven-sided apse, with buttresses on the angles, and a double traceried-headed window on each of the seven sides. It is hoped that the whole of the windows in the chancel will be filled with painted glass. A scheme has been drawn up so that the designs may form a consecutive series, illustrating the principal events in the life and death of our Lord. Each window having two lights, will contain a couple of subjects. The following is the proposed arrangement:—

South window	1. Entry into Jerulsalem. 2. Mary anoints Christ's feet.
North window	3. Christ washing the disciples' feet. 4. Last supper.
South	5. Agony in the garden. 6. The betrayal.
North	7. Before Pilate. 8. Ecce Homo.
South	9. The crucifixion. 10. The descent from the cross.
North	11. The body of Christ. 12. The entombment.
Centre	13. The resurrection. 14. The ascension.

Nos. 9 and 10 have already been given by Alderman Hornby, and No. 13 by Mr. J. Morris. These three designs have been executed by Mr. Wailes, of Newcastle-on-Tyne. One of the two-light windows of the south aisle has been filled with painted glass by Wailes: the subjects delineated illustrate the texts, "Suffer little children to come unto me," and "Feed my lambs." In the quatrefoil above the two lights is an angel bearing a scroll. If funds can be obtained, the large west window will also be filled with stained glass. It is probable that the subjects will illustrate Old Testament events. The church is provided with open benches of white deal, varnished, and will seat about 750 adults. The contractors for the various departments are as follows:—Mr. Thomas Whiteley, mason; Messrs. Shires & Son, joiners; Messrs. Watson & Wormald, slaters; Mr. Lindley, plumber and glazier; Mr. Blakey, plasterer; Messrs. Wood & Son, painters; Messrs. Nelson & Sons, for heating apparatus, &c.; Messrs. Mawer & Ingle, for the stone carving, and for the pulpit, reading-desk, font, and communion rail. Mr. John Kay has performed the duties of clerk of the works. The cost of the church, inclusive of the purchase of the land and the stained-glass windows, may be roundly estimated as above 8,000*l.* This sum includes the tower, which was not originally contracted for by the Board.

DISSENTING CHURCH-BUILDING NEWS.

Ilkley.—The memorial stone of a new Methodist Chapel, at Ilkley, has been laid. The new buildings, inclusive of 1,000*l.* for the land, are estimated to cost about 4,500*l.*, of which upwards of 2,000*l.* have been subscribed. These buildings will front the Wells-road, having Promenade-road on the western side. The style of the chapel is Gothic of the twelfth century, and the front has a centre and two side-entrances. Over the principal doorway there will be a large four-light window, having tracery in the upper part. The staircases to the galleries are placed on either side, that on the east being of a semicircular shape, and forming a termination to that front, whilst the corresponding one occupies the lower portion of the tower. The side elevations of the chapel contain alternately two-light and three-light windows, with tracery heads, the latter of which are carried up above the eaves, and surrounded by gables. These fronts are also improved by the gables of the minister's residence, which contain circular tracery windows, and help to express the character of the building. The tower rises at the south-west angle of the building, with buttresses terminating at the belfry windows. Each face of the tower contains one of these windows. The spire is carried to a height of about 120 ft. from the ground, with angle pinnacles and gablets. The interior of the chapel is divided into five bays by iron columns which support the galleries, and are continued up to the roof. These columns have ornamental bands and enriched capitals. There are also recesses at either end, that at the front extending over the entrance vestibule, and the one at the other end forming an organ chamber and staircase communicating with the minister's vestry, and enclosed by an open screen of a decorated character. The centre part of the ceiling is formed by curved ribs springing from the caps of the columns which support the roof timbers, the greater portion being exposed to view, but the spars of the roof are concealed by a plaster ceiling, in order to add to the warmth and acoustic properties of the building. Ventilation is provided by openings in the ceiling, and the lighting is effected by star pendant gas burners. The seats, gallery fronts, pulpit, and the joiners' work throughout, are

designed in accordance with the character of the building, and will be stained and varnished. In addition to the chapel itself the building comprises a school-room, 40 ft. by 36 ft., and two rooms for the chapel-keeper in the basement. The width of the building is 45 ft., and the extreme length 96 ft., of which about 20 ft. are occupied by the minister's house in the rear, and the chapel is calculated to seat 650 adult persons, 400 on the ground floor. It is estimated that the total cost of the building, exclusive of the land, will be about 3,500*l*. The design for the chapel was selected in a competition, Messrs. Andrews, Son, & Pepper, of Bradford, the architects, being the successful competitors.

Coventry.— The memorial stone of a new Baptist chapel has been laid in Gosford-street, a destitute part of the city. The style of architecture is Italian, with a slight Gothic treatment in mouldings and other details. The total cost, including land and fittings, will be 2,100*l*., of which about 1,007*l*. have been already subscribed or promised. The architect is Mr. J. D. Webster, of Sheffield; and the builders are Messrs. Hallam & Co., of Coventry, who have entered into a contract to complete the whole for 1,601*l*. 5s. 5d. The materials used in the construction of the walls are red brick, from the neighbourhood, with Bath stone dressings; the arches to windows being relieved with voussoirs of white and blue brick. The woodwork is stained and varnished. Galleries are provided at the sides and one end of the chapel, and are reached by stone staircases. Behind the chapel, and immediately adjoining, are the schools. On the ground-floor is the boys' school, 35 ft. by 27 ft.; also a commodious kitchen and store-room. The upper floor is devoted to the girls' school, which is 45½ ft. by 27 ft., and is approached by a stone staircase. Attached to this room are two class-rooms, each 13½ ft. by 13½ ft. The schools and class-rooms will be heated by open fireplaces. Attention has been paid to the means of ventilation, which are simple. The schools provide accommodation for about 450 children, and the chapel will have sittings for 700 persons. The total cost, including site, gas-fittings, law expenses, &c., will be upwards of 2,100*l*.

SCHOOL-BUILDING NEWS.

Wolstanton.—The foundation-stone of a new Sunday-school building has been laid on a piece of ground adjacent to the Wesleyan Chapel at Wolstanton. The plans of the new building have been gratuitously furnished by Mr. T. Roberts, of Trentham. The school will be in subordinate keeping with the Gothic chapel, near which it is to stand, with its front towards a new street which is to be laid out shortly. There will be one large room 70 ft. by 50 ft., with five class-rooms for teaching and for a library. The roof of the building inside will be supported by four circular ribs, and the floors will be boarded. The place will be lighted with three Gothic windows, glazed with the same kind of glass as that used in the windows of the chapel, and it will be warmed with hot-air pipes. The contractor for the building is Mr. W. Sutton, of Newcastle, and the cost will exceed 900*l*.

Bilston.—The memorial stone of the new day and Sunday schools, which are now in course of erection by the side of the Wesleyan chapel, Bilston, has been laid. According to the plans which have been accepted by the committee, the new buildings will comprise one large school-room, 58 ft. 6 in. by 45 ft. 3 in., with a range of ten class-rooms,—five on each side. Eight of the class-rooms will measure 8 ft. square each, and the other two 15 ft. 6 in. by 8 ft. There will be a gallery over the front entrance 18 ft. long by 11 ft. 6 in. wide, and two side porch entrances. At the two back external corners space will be provided for warming apparatus and boiler. The large school-room will be lighted from windows placed above the elevation of the class-rooms, which are a few feet lower than the main building. The walls internally will be wainscotted 5 ft. from the floor, and all the joinery-work inside will be stained and varnished. The ceiling will be a level one. The front of the building is to be of pressed bricks. The schools are intended to accommodate about 600 children, and the total cost is estimated, exclusive of the value of the old materials, at about 1,000*l*. The contract for the joinery and timber work has been taken by Mr. R. Hickman; that for the brickwork by Mr. Thomas Johnson; and the plumbing and slating by Mr. Beebee.

Longton.—New schools in connexion with the district parish church of Edensor have been erected and opened. The site,—upwards of 1,400 square yards,—is adjacent to the church, and is the gift of Mr. Heathcote. The schools have been erected from the plans and designs of Mr. C. Lynam, of Stoke, by Messrs. Collis & Hudson, of Longton, who have carried out the contract. The total cost, exclusive of the land, will be upwards of 1,100*l*. The internal arrangements include accommodation for a mixed school of boys and girls and an infant school.

PATENTS CONNECTED WITH BUILDING.

APPARATUS FOR VENTILATING BUILDINGS, &c.—*J. S. Smith.* Dated 27th November, 1867.—The patentee claims the use and application of a movable cap, cover, plate, or equivalent for opening and closing the upper end of air-shafts used as ventilators for the purpose of excluding dust, dirt, and extraneous matters, irrespective of the form thereof, or of the mechanical means employed to effect their rise or fall. Secondly, the general construction, arrangement, and combination of the apparatus for the purpose, as described.

CONSTRUCTION OF ARTICLES OF EARTHENWARE.—*J. R. Pratt.* Dated 28th November, 1867.—This invention relates to an improved method of joining together the separate parts of articles of earthenware by forming on them male and female screw threads while the clay or plastic material from which the articles are made is in a soft state.

VENTILATING ROOMS, &c.—*J. P. Parkes.* Dated 29th November, 1867.—These improvements are applicable chiefly to such houses or buildings as are provided with a circulation of hot water. In carrying ont the invention the patentee encloses a tube or series of tubes in a casing forming an air space, and placed above the chamber to be ventilated, the said tube or series of tubes being heated by the hot water circulating through them. The casing is placed in communication with the chamber to be ventilated by means of a tube terminating in a grating placed in the wall of the chamber. The upper end of the outer casing is connected with a pipe leading out into the open air, where it is surmounted by a cowl. The rarefaction of the air surrounding the heated tube or tubes, and contained in the outer casing, causes the air to ascend and escape into the atmosphere by means of the pipe and cowl above mentioned, thus forming a partial vacuum in the pipe below the heated tubes, the air in the chamber being drawn off through the grating to supply its place, thus effecting a continual ventilation of the chamber so long as the tubes are kept heated.

CONSTRUCTION OF METALLIC AND OTHER BUILDINGS.—*R. Porter.* Dated 2nd December, 1867.—This invention has reference principally to buildings constructed mainly of metal, and consists, first, of the following method of constructing the walls of the said buildings:—The patentee makes the said walls of corrugated sheeting, either of iron or zinc, the corrugations being situated vertically, and he supports and strengthens the said walls by means of standards made of metal, rolled or otherwise formed into a trough-like figure. The said standards are fixed against the corrugated walls in such a position that the edges of the said trough-like standards fall into and fit against the bottoms of the corrugations in the walls. The standards may be made of a width proper to include two, three, or more corrugations. Along the interior of the walls, and nearly midway between the floor and roof, he fixes horizontal rails, which may be made of wood, iron, or of both combined. The said horizontal rails are supported in brackets connected with the standards, the connexion between the said standards and brackets being effected through holes in the corrugated walls. Horizontal rails of the kind described may also be fixed in a similar manner at any required height inside the building. The standards may be fixed inside the building, and the horizontal rails outside, where required. The walls may be lined internally with a cheap description of paper board, such as mill-boards, straw-boards, and the like. He attaches the said lining by making it in sheets or panels, which are inserted in rebates, or grooves of wood or metal, fixed to the walls or to the horizontal rails. The invention consists, secondly, of the following method of attaching the ridge-caps on the roof of metallic buildings, and other buildings having corrugated metallic buildings. On the summit of each side of the roof he fixes a strip of hoop-iron, which has been corrugated with corrugations similar to those of the roof-plates. The said strips of corrugated hoop-iron are so fixed on the summits of the sides of the roof that the concavities in the said strips are opposed to the concavities in the roof-plates, and there is thus formed a series of nearly circular spaces or openings. The ridge-caps are fixed upon the said corrugated strips of hoop-iron. There is thus left a series of nearly circular openings along the whole length of the ridge of the roof, by means of which the ventilation of the building is effected.

IMPROVEMENTS APPLICABLE TO WATER-CLOSETS AND PUMPS CONNECTED THEREWITH.—*J. H. Wilson.* Dated 3rd December, 1867.—The patentee claims, first, constructing closet pans or basins of glass; secondly, forming the same at the lower end with a shank or hollow faucet, having a lateral opening or aperture therein for discharging the contents thereof, substantially for the purpose and in the manner described and set forth; thirdly, turning the closet pan on its vertical axis for discharging its contents, substantially for the purpose and in the manner described and set forth; fourthly, constructing closet pans so that they may be removed or lifted from their seats, substantially for the purpose and in the manner described and set forth; fifthly, forming the rotating pan, neck, or seat of the rotating pan with recesses to receive tallow, or other lubricating material; lastly, the general arrangement and combination of the several parts described and set forth as applied to ships' and other water-closets.

Books Received.

"NOTES on St. Patrick's Church, Jordanstown, in the parish of Carnmoney," is chiefly devoted to an account of the saints represented in stained glass in the chancel windows. The building, designed by Mr. Lynn, is in the round-arched style of the early architecture of Ireland, and includes a "round tower," attached, 73 ft. high and 14 ft. 6 in. in diameter at the base. The upper portion of the tower forms the belfry. We do not know of any other modern appropriation of these forms in Ireland.——"Right to Light and Air, being a Summary of the Laws relating to Ancient Windows;" by O. S. Round, Barrister-at-Law (Amer, Lincoln's-inn-gate), is a reprint from the *Estates Gazette*. It serves to introduce the matter to those who require a general knowledge of it; but those who have to fight the question must look to a bigger book. ——The current number of the *Art-Journal* contains a view of The Hermitage (the picture-gallery), St. Petersburg, and, *inter alia*, a paper by Professor Ansted on "The Influence of certain Physical Conditions on the Origin and Development of Art." Mr. C. J. Richardson is contributing a series of papers, illustrated, "On Picturesque Garden and Villa Architecture." The admirable catalogue of the Paris Exhibition was concluded in the August number.——*The Broadway* begins a new series (giving up the special American element) with a very good number, including the vigorous commencement of a new novel by Mr. H. Kingsley, called "Stretton;" the Rev. Newman Hall's American Notes; and several other interesting papers. ——*The Tourist's Annual for* 1868 (Hogg, York-street) is damaged by a common cover. It contains a good deal of amusing and suggestive writing, and would be found valuable by many who are seeking to determine how to spend their holiday.——"Remarks on Street Tramways applied to London and its Suburbs." By Herbert Bright, C.E. London: Spon. In this pamphlet, which is printed for private circulation, the author gives an account of his patented plan of tramway traffic. He proposes to form tramways with rails or trams sloping slightly outwards at either side so as to be adapted to wheels coned round the circumference on the inside and flat on the outer, so as to enable them to run either on or off the trams. The vehicles are seated, inside and out, the reverse way to that of omnibuses, passengers sitting back to back inside, and face to face outside. The patentee proposes to form tramways, not through the main thoroughfares generally, but through bye streets near them, so that the tramway traffic would interfere as little as possible with that of the chief thoroughfares. A map shows several

proposed routes through London and its suburbs, south and north.——"The Saturday Half-holiday Guide to London and the Environs." Second edition with map of the environs.—This useful threepenny guide gives particulars as to open-air resorts, such as the parks and environs, commons and open spaces, cemeteries, cricket-grounds, rowing clubs, rivers, and distances, fishing-waters, bathing places, and gymnasia; also as to the free national Exhibitions.——"On the Removal of the Sewage of the City of Glasgow and the Purification of the River Clyde." By William Robertson, C.E. Printed at the University Press, Glasgow. 1868. The author some years since advocated a system of sewage by pumping and utilization. This system he now disclaims, and suggests another, in which the tidal waters of the estuary are to be used to flush the river from the point where the sewage would be discharged into it, carrying it out to the Firth, in front of the towns of Port Glasgow and Greenock. The reservoir would be 9½ miles long, with a wall 15 ft. high, inclosing an area of about 1,300 acres, so impounding 150,000,000 cubic feet of water each tide, or double that quantity daily, to be let out through flood-gates at its lower extremity, above Port Glasgow.——"Hand-book of Fresh Water Aquaria." Edited by James Bishop, &c. London: Dean & Son. In this hand-book instructions are given for the construction and management of fresh water aquaria for gold-fish, &c., and the treatment of plants, fish, molluscs, beetles, &c., kept therein, or in glass globes. The present is the fourth edition, revised and improved. It is illustrated with engravings.——"Loughborough Water-supply." A report prepared by the town surveyor, Mr. George Hodson, on this subject, has been presented to the local board. It points out the necessity for the adoption of some system of water-supply to replace the local wells in the midst of soil saturated with the contents of cesspools, which sufficiently account for the prevalence of diarrhœa and other ailments at Loughborough. There are two schemes under consideration; one by a company, who propose to impound the Black Brook waters; and another by the local board, who propose to take the Wood Brook waters. The reporter advocates the local board's scheme, which will cost about 16,500*l.*, including Parliamentary expenses, or 13,000*l.*, exclusive of these.

Miscellanea.

HOT-HOUSE WORKS.—Messrs. Weeks & Co. (Chelsea) have issued the twelfth edition of their "Trade Book," containing a number of designs, some of them very appropriate, for winter-gardens, conservatories, hot-houses, vineries, and forcing pits. If the approximate cost were attached it would be an advantage. The vulgar colouring of some of the views does them injustice. Mr. Weeks has long been known as a successful and trustworthy builder and heater of horticultural structures.

DEATH OF SCHONBEIN, THE DISCOVERER OF OZONE AND GUN COTTON.—Dr. Schonbein died the other day at Baden. He was born in 1799 at Mitzingen, in the kingdom of Wurtemburg, and was consequently in his seventieth year. He made the discovery of gun-cotton somewhere about thirty years ago. He disposed of his interest in the invention to Baron Lenk, who, after years of research and experiment, made the explosive manageable. Lenk span the cotton and wove it into fabrics suited for cartridges. Prentice & Sons, who hold the patent in this country, adopted his plan, but now make the gun-cotton into paper, which is rolled up for cartridges. Collodion, the solution of an imperfect gun-cotton in ether, became a valuable application in surgery, and afterwards became the film on which glass photographs were taken. Schonbein had then lost all interest in its development, and was busy with experiments in allotrophy which led to the discovery of ozone. He had observed certain atmospheric effects accompanied by a peculiar odour, and research led to the discovery of ozone, which he pronounced to be oxygen in a different condition. The subject was one of intense interest to the chemist, and he worked at it till his death. Sanitary science, which has had many a tough problem to solve, seems likely to have the road smoothened in no small degree by the discoverer of ozone.

SQUARE SET AND MACADAM PAVING IN LIVERPOOL.—At the local Health Committee, last week, Mr. Robertson Gladstone called attention to the large quantity of macadam being laid down in Church-street, and said he thought the question would arise shortly whether it was desirable to lay down so much macadam when there were now square sets equally available for the purpose. The small square sets which had been laid down in North John-street and Dale-street were almost noiseless, and far cheaper than macadam. It was agreed to refer the matter to the borough engineer.

STONE UNDER FIRE.—Some short time since a house in Hanover-square, the residence of Mr. and Mrs. Dallas, was unfortunately considerably injured by fire, more especially in the upper part. A glance at the cornice outside shows a suggestive fact. The flames rushed out of the two-pair windows, and above them, exactly to the extent of each opening, the heavy stone cornice is either completely burnt away, or otherwise destroyed by the effect of cold water on the heated stone. We should apprehend, however, that the former was the case: had the damage been caused by the cold water, it would not have been confined so exactly to the width of the window, as it is now.

THE SANCHI TOPE IN CENTRAL INDIA.—This is one of the most ancient and remarkable Buddhist architectural remains in India, dated 250 B.C.; and recently an application was made to the Begum of Bhopal, in whose territories it is, by the French Consul-General, M. Place, to allow the principal gateway of the tope to be carried off and set up in Paris! The Begum, who is Mahomedan, and indifferent to Buddhist buildings, before consenting to M. Place's proposal, offered the gateway to the Indian Government, to be sent to England. The Indian Government, with proper feeling, declined the gift, and recommended that the tope should be conserved, and suggested that it would be quite sufficient for France and England to have casts of the gateway, which is of a highly decorative character.

FATAL GAS ACCIDENT.—Mr. C. C. Lewis, the coroner for Essex, has held an inquest at Stratford on the body of Mr. Henry Bennett, late landlord of the Railway Tavern, Stratford New Town. A lengthened inquiry showed that the deceased took down a double branch gaslight in his bedroom, and ineffectually stopped the service pipe with a cork. Scenting an escape of gas, he lighted a match to discover the leakage, when an explosion took place, and his clothes becoming ignited he was so severely burnt that he lingered in great agony till the next day, when death ended his pains. His wife and child, who had gone up-stairs with him, were also severely burnt. In summing up, the coroner pointed out the necessity of doors and windows being at once thrown open on the least suspicion of gas escaping, and the jury expressed a hope that the press would publish such a needful caution. A verdict of "Accidental death, caused by an explosion of gas," was recorded.

CO-OPERATIVE ASSOCIATIONS.—The magnitude and progress of these great retail stores in the manufacturing districts of the north of England are very remarkable. In Lancashire there were 121 of them last year, and the large sum of 2,833,345*l.* was received by these establishments in cash for goods in 1867. The best of them appear to sell only for cash, and give no credit; but some allow a short credit to members up to a certain amount. Two great retail associations at Oldham do business to the amount, together, of about 200,000*l.* in the year, and realise good profits for the members. In Yorkshire the money received for goods sold by these societies in 1867 reached 1,425,024*l.*; Yorkshire and Lancashire have several receipts exceeding 100,000*l.* in the year. In Durham the sales of the year were to the amount of 264,492*l.*; in Northumberland, 207,765*l.*; Cumberland, 91,105*l.*; Cheshire, 173,243*l.*; Staffordshire, 42,177*l.*; Derbyshire, 81,710*l.*; Monmouthshire, 24,918*l.*; Glamorganshire, 24,733*l.*; Gloucestershire, 71,599*l.*; Wiltshire, 28,955*l.*; Nottinghamshire, 45,795*l.*; Leicestershire, 26,251*l.*; Northamptonshire, 116,844*l.*; Middlesex, 140,647*l.*; Surrey, 60,109*l.*; Kent, 56,038*l.*; Essex, 23,346*l.* The amounts in other counties were below 20,000*l.*,—in Warwickshire only 6,200*l.*, and not 4,000*l.* in Devon, Dorset, or Salop. These statistics would have gladdened the heart of Robert Owen had he been alive.

THE EGRESS FROM CONCERT-HALLS AT BIRMINGHAM.—At the conclusion of the local licensing meeting, the Mayor announced that the magistrates had adopted a resolution to the effect that the attention of the proprietors of music halls and large concert-rooms be specially directed to the necessity of having a proper and sufficient means of egress in the event of an alarm. Particular attention to the subject is expected before next licensing day.

THE SCULPTURAL ORNAMENTATION OF CHESTER TOWN-HALL.—The raising of the images at the town-hall, Chester, is a matter of embarrassment to the council. To one thing they appear committed, that is to spend 400*l.* on the matter, for that was included in the contract; but in what precise way they are not by any means determined. "Messrs. Lanyon & Co.," remarks the local *Chronicle*, "are naturally anxious to have a fine building, adorned with stained windows, elaborate sculpture, and all that can make it rich in effect. The city would gladly second them but for one consideration—it has to find the money. At the present juncture the last thought will have to take precedence of the first."

ROCK BLASTING.—At Caldon Lowe, Staffordshire, an attempt has been made to level a rock by a monster blast. The rock formed part of the limestone quarries of the North Staffordshire Railway Company, whose canal engineer, Mr. Forbes, directed the operation. The rock had been perforated at its base, a chamber 5 ft. square having been formed at the end of the tunnel. In this chamber 36 cwt. of powder were deposited; and when the powder was fired, the rock opened and crumbled as if by magic. The blast was not quite so successful as was anticipated, but a minor blast was expected to complete the operation, by which, in all, some 14,000 tons of limestone will have been dislodged.

THE GERMAN WORKMEN'S CONGRESS.—This congress has now closed. The programme of the International Working Men's Association, emanating from London, was adopted by a majority of 69 delegates, representing 61 associations, against 46 delegates, representing 32 associations. The consequence was a split, and the minority determined to hold a separate meeting of their own. Some of the resolutions arrived at by the majority are regarded as being rather Utopian. The congress rightly set their faces against war. They recommended working men to abstain from all work on war taking place in their respective countries,—rather an odd determination, certainly, unless the congress disapprove of all defensive no less than offensive war: as well recommend them to abstain from food and drink. That labour is of no country is the fundamental principle of the association; yet their principle is scarcely cosmopolitan; for the congress voted against giving the German Austrians and all other foreigners a deliberative voice in their assembly, although, we presume, they allowed it to Germans resident in countries not German.

FALL OF A HOUSE.—On Sunday evening, a number of persons miraculously escaped death by the fall of a house in Park-street, Birmingham. The house was a three-story building, adjoining other houses on one side. It was occupied by several families, who rented furnished apartments; and, at the time of the occurrence, there were two persons in the attic; five on the middle floor; and three on the lower floor. The whole of the front and side of the house gave way and fell forward, leaving nothing standing except the chimney portion, and the flooring of the attic. The two persons in the attic escaped injury, but the occupants of the second floor were carried away with it, precipitated below, and buried beneath the falling *débris*. The ceiling of the lower floor did not entirely give way, but became formed in the shape of an arch, affording protection to the three inmates below, who would but for this undoubtedly have suffered serious injury from the full weight of the falling materials. In a very short time, however, the whole of the inmates were got from beneath the *débris*, and it was then found that none had received fatal injuries. The building was a very old one; and a house on one side having been removed some time since, attention was called to the unsafe appearance of the structure on that side, but no precaution would appear to have been taken to erect proper supports, a necessity for security which is alleged to have been urged by the tenant.

THE ORPHAN HOUSES, ASHLEY DOWN.—Mr. George Muller has just published his report relative to this institution for the past year, and the following are a few of the interesting facts which he gives:—The amount which he received for the support of the orphans between May, 1867, and May, 1868, was 15,878*l.* 11s. 6½d.; for the building fund he received 6,633*l.* 18s. 5½d.; his receipts in aid of the school, Bible, missionary, and tract fund were 7,825*l.* 8s. 10½d. The average cost of maintenance, including every expense, is 12*l.* 10s. each child.

THE POLYTECHNIC.—A very interesting lecture is daily delivered here by Professor Pepper on Eclipses of the Sun in general and the recent total eclipse in particular. Some of the illustrations are remarkably good. The electric organ has been set up, as we mentioned a few weeks ago, over the proscenium of the large theatre, a cable of 120 wires communicating with it from the key-board at which the organist sits during the performance. The lecture on the eclipse is accompanied by an organ performance. The organist sits at his key-boards in the orchestra, and therefore instantaneously realizes all the suggestions and directions of the conductor, although the organ itself is distant behind the scenery. Moreover, perfect accord with the band is insured with more precision than before.

THE RIGHTS OF RAILWAY TRAVELLERS.—At the Uttoxeter Police-court, Mr. Buchanan Finlayson, a commercial traveller from London, was charged by the North Staffordshire Railway Company under the following circumstances:—He took at Derby, a few days previously, a third-class ticket to Ashbourn, for which he paid 1s. 3d. On reaching Uttoxeter he alighted, and 3½d. was demanded from him, that making, with the 1s. 3d. he had already paid, the third-class fare from Derby to Uttoxeter, which latter town is about ten miles nearer to Derby than is Ashbourn. He refused to pay the sum demanded, and hence the summons. Mr. Tennant, of Hanley, the company's solicitor, contended that a fraud had been attempted, but the defendant argued that he had a legal right to break his journey at any station short of that to which he had booked. The bench concurred, and therefore dismissed the case.

GAS.—The Sunderland gas company have declared a dividend of 4½ per cent. for the last half-year.——A meeting of gas consumers has been held at Black Heath. The meeting was informed that the Rowley Regis and Black Heath Gas Company are unwilling to grant a reduction except to the smaller class of consumers, who would in future be charged 6s. instead of 6s. 6d. per 1,000. The reason assigned by the directors was, that the shareholders had not received sufficient remuneration for the money invested. The meeting was unanimous in the opinion that it was bad policy on the part of the directors to expect to increase the dividends of the shareholders by continuing to charge so much for their gas, and expressed themselves unwilling to pay such a high price. It was decided to discontinue burning gas at the end of the present quarter, unless the price be reduced to 4s. 6d. per 1,000 ft.——A mode of lighting by gas, to which General Favre has called the attention of the Emperor, is being tried in Paris. The gas is self-made, and the apparatus easy to manage and move about. They say it can be used for heating as well.

SIZE OF THE HOUSE OF LORDS.—Oddly enough while a committee of the Commons has been recommending an enlargement of their House, a committee of the Lords had nearly determined to report that their meeting-place was too large, and that the Peers' Robing-room should be fitted up to serve the purpose better, the present chamber being retained for great State ceremonials. The size of the House of Lords, on the floor, is 84 ft. by 45 ft.; on the gallery level the length is 98 ft. The height is 46 ft. The cubical contents of the House are 173,000 ft., being 46,000 ft. more than the House of Commons. The House of Lords contains seats for 509 persons on the floor and in the galleries. The journals of the House were examined, and they showed that the attendance of peers exceeded 150 only thrice in 1865 and twice in 1866. The report prepared by the chairman of the committee, the Earl of Carnarvon, recommended the adoption of this plan, but it was not retained, the numbers for and against it being equal. The Lords and Commons might change, but this would not suit the arrangements made for the visits of the sovereign.

A NEW CEMENT.—The following directions are given for making cement impermeable by air and steam, which is said to be superior to any in use for steam and gas pipes. Six parts of finely-powdered graphite, three parts of slaked lime, and eight parts of sulphate, are mixed with seven parts of boiled oil. The mass must be well kneaded until the mixture is perfect.—*Mechanics' Magazine.*

A MILLION OF PAUPERS IN ENGLAND AND WALES.—On the 1st day of January of this year the number of paupers in receipt of relief, in-door or out-door, in England and Wales (including lunatics and vagrants) was more than 1,040,000. In the year ending March 25th, 1867, nearly 7,000,000*l.* were expended for the relief of the poor, or more than half a million in excess of the sum spent during the previous year. The rate per head on the population for the relief of the poor was 6s. 6½d. for the year ending March 25th, 1868.

PANIC AT AN AGRICULTURAL SHOW: FALL OF TWO GRAND STANDS.—An alarming occurrence has taken place in the show-ground of the West Riding Agricultural Exhibition, which was being held in Belle Isle Fields, Wakefield. There was a large concourse of people present. Two large stands or slanting [sloping floored?] platforms had been erected, which were thronged with persons. One of the stands fell, and the occupants were thrown upon each other, and some of them seriously hurt. The panic occasioned by the first fall had scarcely subsided when the other stand, which had been overcrowded, also went down. A number of ladies were seriously injured.

REOPENING OF RAGLAN CHURCH.—Raglan Church, Monmouthshire, has been reopened, after extensive restoration. The Duke of Beaufort gave a donation of 600*l.* and also a piece of land for enlarging the churchyard; and the duchess gave the pulpit, of carved oak. In the church is the Beaufort Chapel, which was erected by one of the Earls of Worcester (probably the third), who, in the reign of Henry VIII., greatly beautified the castle and extensive domains, and whose deplorably-mutilated effigy still lies here. Beneath the chapel, in a spacious vault, are interred the remains of many members of this noble family, and among them those of Edward, the sixth Earl and second Marquis of Worcester, who, as is well known, devoted himself to mechanical science, and left behind him an imperishable name as the inventor of the first practical steam-engine.

INFRINGEMENT OF A MANUFACTURER'S DESIGN IN THE POTTERIES.—At the Police-court, Fenton, Messrs. Cockson & Chetwynd, earthenware manufacturers, Coleridge, were lately charged, on the information of Mr. John Edwards, manufacturer, Fenton, with unlawfully copying the design of a jug, for which Mr. Edwards claimed protection by registration certificate. At the beginning of 1866 Mr. Herbert Beech, Mr. Edwards's American agent, came over to England for the purpose of introducing, in Mr. Edwards's interest, a new design in jugs, which were to be specially for the American trade. The distinctive feature of the new jug was the angularity of its top and handle and its raised lip. Messrs. Chetwynd were entrusted with the modelling of the new jug, for which service Mr. Edwards paid them a sum of 129*l.* At this time Mr. Edwards was not aware that Messrs. Chetwynd were connected with a manufactory. Mr. Edwards was surprised a short time after to find that jugs similar in design to his own had been issued from the defendants' manufactory, introduced into the American market, and were "taking" immensely. The only apparent difference in the jugs was the embossed ornamentation of the imitation jugs. The defence set up was, that the said-to-be-new design of jugs, was simply a combination of previously existing forms, and that consequently there was no offence. A fine of 5*l.* was imposed.

TENDERS.

For a new public house, for Mr. G. D. Groom, at Hitchin. Mr. Shilcock, architect:—

Warren & French (accepted)	£390 9 6

For a new house, for Mr. Joshua Whiting, at Hitchin. Mr. Shilcock, architect:—

		Extra if stone dressings to front windows
Butterfield	£500 0 0	£15 0 0
Ansell	475 0 0	7 0 0
Stapleton	473 0 0	14 0 0
Jeeves	472 0 0	9 0 0

For alteration at the Infirmary, Brentford Union. Mr. Holmes, architect:—

Nightingale	£1,887 0 0
Wiles	1,585 0 0
Lodge	1,549 0 0
Crabb & Vaughan	1,547 0 0
Gardener	1,541 0 0
Foale	1,397 0 0
Brunsden (accepted)	1,323 0 0

For six houses in Wynford-road, Barnsbury-road, Islington:—

Mann, Jun.	£2,900 0 0
Hind	2,850 0 0
Turrell, Brothers	2,784 0 0
Mundy & Hutchinson	2,650 0 0
Pett	2,460 0 0
Turner	2,347 0 0
Stentiford	2,200 0 0
Pearce	2,190 0 0
Heath	2,148 0 0
Blackmore & Morley	1,980 0 0
Jay (accepted)	1,770 0 0
Harrison & Edwards	1,750 0 0
Ireson	1,710 0 0
Williamson	1,595 0 0

For additions and part restoration of Bourne Abbey Church, Lincolnshire. Mr. Edward Browning, architect:

Hinson	£1,400 0 0
Richardson & Roberts	1,372 0 0
Millson	1,316 0 0
Bagnell & Tinkler	1,193 10 0
Halliday & Cave	1,172 0 0
Perkins	1,097 0 0
Hall, Norman, & Vinter*	1,080 0 0

* Accepted.

For restoration of Sempringham Church, Lincolnshire Mr. Edward Browning, architect:—

Allen	£994 0 0
Millson (accepted)	910 0 0

For additions to the Deanery, Peterborough. Mr. Edward Browning, architect:—

Peach & Furness	£510 0 0
Halliday & Cave	472 0 0
Perkins	465 0 0
Hobson & Taylor (accepted)	457 0 0

For alterations, repairs, and decorations at No. 27, Grosvenor-street, for Dr. Hartrée. Mr. Frederick P. Walters, architect:—

Killby (accepted)	£540 0 0

For three houses and shops in the High-street, Tunbridge Wells, for Mr. Thomas Elliott. Mr. Henry Stapley, architect. Quantities by Mr. Clever:—

Kilby	£3,849 0 0
Hammond	3,647 14 0
Vidler, Jun.	3,580 0 0
Walker	3,565 0 0
Mercer	3,503 0 0
Strange	3,339 0 0

For alterations to Hawthorndeane, Tunbridge Wells, for Colonel White. Mr. Henry Stapley, architect:—

Hammond	£220 0 0

For erecting boiler-house, &c., Kentish-town, for Messrs. Winsor & Newton. Messrs. George & Vaughan, architects:—

Kelly, Brothers	£487 0 0
R. Mann	478 0 0
Manley & Rogers	471 0 0
King & Sons	460 0 0
Newman & Mann	375 0 0

For rebuilding No. 23, Old Change, E.C. Mr. Danby architect:—

Thompson	£1,750 0 0
Gammon & Sons	1,735 0 0
Carter & Sons	1,661 0 0
Foster	1,644 0 0
Piper & Co.	1,577 0 0
King & Sons	1,560 0 0

TO CORRESPONDENTS.

R. W. Montreal (we will give an answer when we have seen view)—A. B. (the additional run must be completed).—J. R. jun. (the paint mentioned would destroy the appearance of brickwork).—P. J. N. (write to Mr. Bowditch).—Young Architect (no difficulty. Apply to a proper tradesman).—T. C.—A. C.—E. B.—Dr. M.—India.—C. R.—J. W.—R. & R.—J. B. R.—Sir E. L.—An Engineer.—R. B.—Messrs. R.—J. R.—Bow.—F. W.—T. P.—D. K.—J. F.—J. W.—F. P. W.—J. P. H. S.—W. D.—A. D. D.—W. H. B.—F. & W.—A. G.—H. S. F.—Herne Bay.—A lawyer.—A member of the Inn.

Country newspapers should be marked.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Advertisements cannot be received for the current week's issue later than **THREE o'clock**, p.m., *on THURSDAY.*

The Publisher cannot be responsible for ORIGINAL TESTIMONIALS *left at the Office in reply to Advertisements, and strongly recommends that* COPIES ONLY *should be sent.*

☞ *NOTICE.—All Communications respecting Advertisements, Subscriptions, &c., should be addressed to "The Publisher of the Builder," No. 1, York-street, Covent Garden. All other Communications should be addressed to the "Editor," and* NOT *to the "Publisher."*

Now ready,

ATCHLEY'S CIVIL ENGINEER'S and CONTRACTOR'S ESTIMATE and PRICE BOOK.

Demy 8vo, 21s. Illustrated with Plates and Woodcuts, Specifications for Labour and Materials, Contractor's Plant and Tools, with Rules and Examples for the Construction of Public Works.

By W. D. HASKOLL, C.E.

To which is added the Law of Contracts, &c.

London: Publishers ATCHLEY & CO. 106, Great Russell-street, Bedford-square.

PERFECTION in BOOKKEEPING.—BUILDERS and Others desiring a really good system, can have a SET of MODELS for BUILDERS' BOOKS, by DOUBLE ENTRY, to which was awarded the prize offered in "The Builder," No. 1,180, and which has been adopted by many large firms. Also a Modified Arrangement by Single Entry, suitable for small builders.—Address, E. A. 4, St. George's-road, Regent's Park, London.

PARTNERSHIP.—Wanted, a Managing PARTNER in an established Manufactory, capable of great extension. In addition to the manufacture of certain articles of trade, the proprietors hold a patent of approved value and in extensive use. The amount of capital to be introduced to be agreed upon. The highest references given and required. Principals only treated with. Apply by letter only, to R. I. W. N. care of Messrs. Tatham, Carling, & Walls, 3, Frederick-place, Old Jewry, E.C.

PLASTER and CEMENT WORK and Repairs of every description ESTIMATED FOR, in town or country. Shops, House-fronts, and Interiors fitted up à l'instar de Paris. Artificial Stone and Cement Figures, Fountains, Vases, Trusses, &c. constantly in stock.—J. SHORT, Decorative Builder, and Architectural Modeller, 224, City-road, London, E.C.

NICHOLAS LAKE,

ARCHITECT and consulting SURVEYOR.

Bills of quantities accurately prepared, works measured up, builders' accounts adjusted. Railway compensation claims arranged

OFFICES, 1, ADELAIDE-PLACE, LONDON-BRIDGE, E.C.

TO BUILDERS, DECORATORS, &c.

GILDERS, thoroughly experienced in House Work, Decorative Furniture, and Gilding in all its branches, may be OBTAINED at the House of Call, Marlborough Inn, Blenheim-steps, Oxford-street.—Address to the Secretary.

COMPETITIONS, WORKING DRAWINGS, DESIGNS, &c. undertaken on the shortest notice. Perspectives outlined and coloured.—Address, Z. A. care of Housekeeper, No. 1, Long-acre, W.

BOROUGH of SOUTH SHIELDS.—NOTICE to ENGINEERS and SURVEYORS.—Any Person desirous of becoming a Candidate for the Office of SURVEYOR to the Corporation of South Shields, is requested to forward testimonials of qualification, competency, sobriety, and regular business habits, addressed (free of postage) to the undersigned, on or before MONDAY, the 28th of SEPTEMBER instant, it being the intention of the Town Council to proceed to the election on WEDNESDAY, the 7th of OCTOBER next. As the duties of such Surveyor will comprise the Municipal and Local Board of Health business of the Corporation, together with that under the "South Shields Improvement Act, 1853," a Candidate must be familiar with the working and keeping in repair of streets and roads, the practice of engineering, especially hydraulic engineering in connexion with works of water-supply, drainage, sewerage, and surface cleansing, competent to conduct surveys, take levels and sections, prepare plans, drawings, and estimates of work of every description, and able to superintend the execution thereof, test the materials, and see to the fulfilment of the conditions of the contract for executing such works. The whole time of the Surveyor, who is to reside within the borough, must be devoted to the duties which will be assigned to him, and he is not to undertake any other office, employment, trade, or business. Salary 250*l.* per annum. Candidates are to state in their application their age and present and former employment, and the surveyor will have to attend personally all meetings of the Council, of the Town Improvement and Public Health Committees, and of any other Committee to which he may be summoned. The successful candidate will have to give security for the faithful discharge of his duties, by the bond of himself and two sufficient sureties in 300*l.*—By order, THOMAS SALMON,

Town Clerk and Clerk to the Local Board of Health.

Town Clerk's Office, South Shields, September 7, 1868.

THE Town Council of Gateshead invite APPLICATIONS for the Office of TOWN SURVEYOR and BOROUGH ENGINEER of the Borough of Gateshead. The Person appointed will be required to reside in the Borough of Gateshead, to devote the whole of his time to the duties of the office, and be precluded from undertaking any other office or employment. The duties will comprise those of Town Surveyor, Surveyor to the Local Board of Health, Engineer to the Quay Commissioners, and all other services which the Town Council may require to be rendered. Salary 400*l.* per annum, payable quarterly. The engagement terminable on a quarter's notice.—Applications to be sent to Mr. J. W. SWINBURNE, Town Clerk, Gateshead, on or before the 29th of SEPTEMBER, 1868.

WANTED, a PARTNER, with from 3,000*l.* to 4,000*l.* to develop a good trading business, with large orders on hand. A scarcity of the commodity in the market, and large profits to be made. Principals or their solicitors only treated with.—For particulars apply to Messrs. BELLISS & MARCHANT, 6, Martin's-lane, Cannon-street, E.C.

WANTED, an active, intelligent LAD, as IMPROVER in the PLUMBING and GASFITTING.—For particulars, apply to Mr. HELYAR, Fishmonger, &c. Weston-street, Upper Norwood, S.

WANTED, an experienced BUILDER'S CLERK. Must understand prime cost and estimating.—Address, stating age, salary required, and qualifications, with copy of testimonials, to 379, Office of "The Builder."

WANTED, in a Builder's Office, a JUNIOR ASSISTANT who can draw, trace, and assist in measuring. Address, stating age, salary, and where last engaged, to 390, Office of "The Builder."

TO WORKING FOREMEN.

WANTED, a good WORKING FOREMAN, a Carpenter and Joiner preferred. Good character as to ability, sobriety, &c. indispensable.—Apply by letter, stating wages required, and where last employed, to R. C. COOK, builder, 32, Norton-folgate, N.E.

TO HOUSE DECORATORS.

WANTED, in a House Decorator's Establishment, a thoroughly competent FOREMAN. He must have been accustomed to carry out first-class work, and to the charge of a number of men. He will be required to be able to take out and to make up quantities, and to take the general charge of the working department. To a qualified man a Constant Situation, and a liberal salary will be given; but a satisfactory character in every respect will be required.—Address, enclosing references, to GEORGE COOPER & CO. Northumberland Decoration Works, Newcastle-on-Tyne.

TO THREE-BRANCH HANDS.

WANTED, a thoroughly qualified MAN in the above branches, to fill a constant situation in a S. E. London Builder's Shop. None but men of good character need apply.—Address, 328, Office of "The Builder," with reference to last employer and rate of wages required.

WANTED, a RE-ENGAGEMENT, by a practical BUILDER'S FOREMAN. Carpenter by trade. References good.—Address, H. B. 1, John-street, Kingsland-road.

WANTED, an ASSISTANT, well up in architecture, specification, quantities, &c for an office in the City. Situation would be permanent.—Apply by letter, stating experience, reference, and salary expected.—Address, A. M. Housekeeper, 110, Cannon-street, E.C.

TO GENERAL FOREMEN.

WANTED, an OUT-DOOR FOREMAN, to superintend the erection of villas, at ten miles from London. One acquainted with piece-work preferred.—Address, stating age, last engagement, and wages, to Mr. GROVER, Builder, Packington-street, N.

TO PLUMBERS, &c.

WANTED, in a Country Town, a THREE-BRANCH HAND, for a constancy.—Address, stating wages, &c. A. 128, Grange-road, Bermondsey, London.

WANTED, EMPLOYMENT, by a respectable, trustworthy, elderly CARPENTER, without encumbrance. Understands every branch in building, window-blind making, repairing furniture; used to first-class and jobbing work. Would make himself generally useful. Competent to manage a small business. Wages moderate. Country preferred.—Address, S. Post-office, London-road, Southwark.

TO BUILDERS.

WANTED, a RE-ENGAGEMENT, by a GENERAL FOREMAN, who has a thorough knowledge of all the branches of the building trade. Long experience.—Address, A. 2', Queen's-row, Walworth-road, S.

WANTED, by a respectable Young Man, a SITUATION as IMPROVER to the PLUMBING. Can fill up time with painting or glazing. Would like to learn gas fitting. Wages no object.—Address, A. B. 24, Gawthorn-street, North, Bow.

TO CARVERS, MONUMENTAL MASONS, &c.

WANTED, by a Young Man, a SITUATION as CARVER, and to assist in the Letter-cutting, &c. No objection to take time. Town or country.—Address, D. G. R. 55, Bemborough-place, Pimlico, S.W.

TO ARCHITECTS AND SURVEYORS.

WANTED, an ENGAGEMENT. Has been four years as Chief Clerk in one of the principal London offices. Used to drawings, details, specifications, quantities, measuring up, &c. References to present and other employers.—Address, 367, Office of "The Builder."

TO ARCHITECTS, &c.

WANTED, a SITUATION, by a thoroughly practical CLERK of WORKS of many years' experience on large jobs.—Address, No. 317, Office of "The Builder."

TO HOUSE DECORATORS AND OTHERS.

WANTED, by the Son of a Tradesman, Constant EMPLOYMENT in WRITING and PAPER-HANGING. Fill up time with other branches of the trade. Country preferred.—Address, J. G. 4, Gunnersbury-place, Brentford-road, W.

TO BUILDERS AND OTHERS.

WANTED, EMPLOYMENT, by a good JOBBING BRICKLAYER. Wages 7*d.* per hour.—Address, H. M. 6, Devonshire-cottages, First-street, Chelsea.

TO BUILDERS.

WANTED, a RE-ENGAGEMENT as SHOP FOREMAN of JOINERS, or Work by the Piece. First-class reference.—Address, J. M. 13, Hatfield-street, Blackfriars-road.

TO CARPENTERS AND BUILDERS.

WANTED, by a Young Man, a SITUATION as IMPROVER. Has been 18 months at the trade. Wages, 14*s.* a week.—Address, A. T. 13, Hanover-square, Kennington Park-road.

WANTED, a RE-ENGAGEMENT as BUILDER'S CLERK. Well acquainted with the office duties in all branches. Aged 34. No objection to a temporary engagement, or the country.—Address, A. Z. 1, Angela-gardens, Crabtree-row, Hackney-road.

TO BUILDERS AND DECORATORS.

WANTED, a SITUATION, by a Young Man, as FOREMAN of PAINTERS. Is a good oak grainer and plain writer. Has been in business for himself ten years, and has a good knowledge of the trade generally. Good references.—Address, B. YOUNG, 1, Buckingham-street, near Buckingham Palace, Pimlico.

TO ARCHITECTS.

WANTED, an ENGAGEMENT, as JUNIOR ASSISTANT. Can prepare drawings from rough sketches; is a fair colourist, and well up in office duties. Unexceptionable references. Town or country.—Address, X. Y. Z. 66, High Holborn.

WANTED, an immediate RE-ENGAGEMENT, by a general and efficient ASSISTANT, who has had considerable experience in London and provincial offices. Well up in Gothic and Italian detail, perspective, levelling, &c. Terms strictly moderate.—Address, W. F. F. 3, Malcolm-street, Cambridge.

WANTED, an ENGAGEMENT as TIMEKEEPER, STOREKEEPER, or WAREHOUSE CLERK. Has filled all the above situations. Aged 38. Married. Good references.—Address, W. G. 15, Albion-street, Caledonian-road.

WANTED, to APPRENTICE a YOUTH, aged from 14 to 15, to the BUILDING TRADE (In-door). Country preferred.—Apply to 13, St. John's-square, Clerkenwell, London.

WANTED, by a thoroughly practical CLERK of WORKS of many years' experience in first-class works, a RE-ENGAGEMENT.—Address, A. B. Post-office, 161, Sloane-street, Chelsea.

TO BUILDERS AND LANDLORDS.

WANTED, by a sober, industrious Young Man, a CONSTANCY, as JOBBING BRICKLAYER, PLASTERER, and SLATER. Good references, if required.—Address, J. H. Post-office, opposite Camden-road, Upper Holloway, N.

TO BUILDERS AND DECORATORS.

WANTED, by a practical Man, a constant SITUATION, in a Country Firm, as first class WRITER and GRAINER, PAPER-HANGER, &c. No objection to filling up time at painting. Wages, 7*d.* per hour. Good references.—Address, 330, Office of "The Builder."

WANTED, by a thoroughly persevering energetic Man, a RE-ENGAGEMENT as GENERAL FOREMAN of WORKS, or Foreman of Joiners. First-class references. Can prepare plans. No objection to fill up time with the tools, or to take a good country job.—Address, H. Post-office, Great Portland-street, Regent's Park.

WANTED, by an ARCHITECT, aged 23, a SITUATION in a first-class Office, Gothic preferred. In addition to architectural, has a considerable knowledge of freehand and figure drawing.—Address, A. B. care of Mr. Jackson, Bookseller Ulverston.

TO BUILDERS, ROAD MAKERS, AND CONTRACTORS.

WANTED, by a first-class practical Man, a Carriage-way Pavior, Street Mason, Granite Dresser (wood, bricks, Dutch clinkers, or tiles), to TAKE WORK by the PIECE, Labour only. Good testimonials and references.—Address, JAMES CRUTCHLEY, 7, James-place, North-street, Poplar.

TO BUILDERS.

WANTED, by the Advertiser, a SITUATION as TIMEKEEPER and CLERK. Fill up time at bench. Five years' experience. Town preferred.—Address, W. F. C. "The Gresham," High Town, Luton.

TO BUILDERS, CONTRACTORS, &c.

WANTED, by the Advertiser, aged 24, a RE-ENGAGEMENT as BOOK-KEEPER and GENERAL CLERK. Thoroughly conversant with the routine of a Builder's office, and can assist at estimating.—Address, A. B. 10, Malvern-road, Dalston, N.E.

TO BUILDERS AND CONTRACTORS.

WANTED, a RE-ENGAGEMENT as FOREMAN of CARPENTERS and JOINERS, or Principal Foreman. Has been used to measuring, estimating, and book-keeping. Has been employed in London, and has carried out several extensive works in the country. Fourteen years' experience.—Address, W. H. F. 44, Dom-street, Dover, Kent.

WANTED, by a Young Man, aged 22, a SITUATION as BUILDER'S CLERK. Can take out quantities, estimate, trace plans, &c. Seven years' experience. Good references.—Address, C. B 367, Edgware-road, W.

TO IRONMONGERS, GASFITTERS, AND BUILDERS.

WANTED, a constant SITUATION as WHITESMITH and GASFITTER. Four years' reference from present employer. Country letters to state wages.—Address, H. H. 41, Upper Manor-street, King's-road, Chelsea.

TO ARCHITECTS.

WANTED, an ENGAGEMENT in a Gothic Office.—Address, X. W. Post-office, Greek-street, Soho.

TO BUILDERS AND CONTRACTORS.

WANTED, a RE-ENGAGEMENT, by the Advertiser. Is thoroughly experienced in taking off quantities, measuring, estimating, accounts, and general office routine.—Address, J. A. 4, Herne-place, Dulwich, S.

WANTED, by a practical and experienced ENGINEER and MILLWRIGHT, a SITUATION as FOREMAN in Engineering Works or Mill. Nearly twelve years in last situation, manufacturing powerful cotton presses and steam machinery. The highest testimonials can be given.—Address, C. T. C. 5, John-street, Pentonville-hill, N.

TO BUILDERS AND PLUMBERS.

WANTED, a SITUATION or JOB, by an experienced PLUMBER.—Address, A. 38, Waverley-road, Harrow-road, W.

WANTED, by a Young Man, of steady habits, aged 23, a SITUATION as good PLUMBER, HOT-WATER PIPES, &c. Can do plain smework and gasfitting. Town or country. A reference if required.—Address, F. H. 7, Mildmay-street, Bath's-pond, Islington.

TO PLUMBERS, &c.

WANTED, by a Young Man, a SITUATION as THREE-BRANCH HAND, in Town or country.—Address, M. N. 36, Blenheim-street, Chelsea.

TO ARCHITECTS AND BUILDERS.

WANTED, by a thoroughly practical Man, a RE-ENGAGEMENT as CLERK of WORKS, or as General Foreman. Has had considerable experience in building construction. Good references.—Address, A. Y. No. 4, Albert-place, Deptford-road.

TO PAINTERS AND BUILDERS.

WANTED, by the Advertiser, a SITUATION as PAINTER, GLAZIER, and PAPERHANGER. Can do some plumbing if required. Six and three years' good character.—Address, W. C. 76, Great Bland-street, Dover-road, Borough, London.

WANTED, by the Advertiser a SITUATION as CLERK, or to Manage a Business. Has been five years in a builder's and contractor's office.—Address, C. P. 18, Charles-street, St. John's Wood, London, N.W.

WANTED, a RE-ENGAGEMENT as CLERK of WORKS, BOOK, TIME, or STORE KEEPER, by an energetic Young Man (aged 26), of nine years' experience. Good knowledge of accounts and public works generally. Can be well recommended.—Address, R. F. 93, Great Suffolk-street, Borough, S.E.

TO BUILDERS AND SURVEYORS.

WANTED, by a practical Builder, aged 33, a SITUATION, as MANAGER or ASSISTANT. Has carried out extensive contracts, and is thoroughly experienced in every branch of the trade, and can design, prepare drawings, and estimate.—Address, A. B. 26, Albion-square, Dalston.

TO ARCHITECTS, SURVEYORS, AND BUILDERS.

WANTED, an ENGAGEMENT, by a fully-qualified ASSISTANT, to prepare working, detail, and finished drawings, take off and prepare bills of quantities, specifications, or as estimating and measuring-up Clerk.—Address, A. B. Mr. Stone, Builder, 33, Emerson-street, Bankside, Southwark, S.

WANTED, by a First-class PLUMBER, GAS-FITTER, and HOUSE DECORATOR, who has had great experience both in old and new work, a SITUATION or PIECE-WORK. Good references.—Address, 369, 19, Henry-street, E. St. John's Wood.—P.S. Could take a Foreman's place or Manage a Business.

WANTED, a RE-ENGAGEMENT, in an Architect's or Builder's Office, by a good and rapid DRAUGHTSMAN; well up in construction, working and detail drawings, quantities, specifications, and surveying, and accustomed to measure up works. Good testimonials. Town or country.—Address, ALPHA, Messrs. Bennett & Thorne, 190, Borough, London.

WANTED, an ENGAGEMENT, either as BUILDER'S FOREMAN or CLERK of WORKS. Has had sixteen years' London experience, and at present just completing a large sewerage contract upon the seaside. Good references from present employer. Aged 30 years. Either country or abroad.—Address, H. B. 35, Adelphi-terrace, Old Ford-road, Victoria Park, Middlesex, N.E.

WANTED, a SITUATION, by an energetic BUILDER'S FOREMAN of good character and experience in general building and estate work. A carpenter by trade. Country preferred.—Address, FOREMAN, care of Mr. Hickson, 32a, St. Andrew's-hill, Doctors'-commons, E.C.

TO BUILDERS AND OTHERS.

WANTED, a RE-ENGAGEMENT as WORKING FOREMAN MASON. Thoroughly conversant with ornamental and decorative church-work, in hard and soft stone. Total abstainer. Good reference from present and previous employers.—Address A. B. Baptist Chapel, Stockport, Cheshire.